PHOTOGRAPHY FOR NOVICES

[illegible]
HANDBOOK

PRICE 1/-

ILFORD PLATES

For every kind of Camera
at THE SAME popular
Prices for ALL varieties.

ILFORD PLATES

Have an Unrivalled Reputation,
extending
over more than 23 years.

ILFORD PLATES

Are the Beginner's staunchest friends.
They enable him to obtain
the BEST Results easily and surely.

ILFORD PLATES

Are the
Artistic and Scientific Expert's
most reliable servants.

Stocked by ALL DEALERS everywhere

Sole Makers

ILFORD, Limited, ILFORD, LONDON, E.

ILFORD P.O.P.

Reg Trade Mark

Absolutely the Finest
Gelatino-Chloride Paper.
Glossy and Matt.

ILFORD PLATONA

A Genuine PLATINUM Paper
at Popular Prices.
Easy to work successfully.

ILFORD BROMIDE

PAPERS, in Five Superb Varieties,
for Contact Printing
and Enlargements.

ILFORD GASLIGHT

PAPER. No Dark-Room Needed.
Brilliant Blacks.
Pure Whites. Delicate Half-Tones.

At POPULAR PRICES, of All Dealers everywhere.

SOLE MAKERS:

ILFORD, Limited, ILFORD, LONDON, E.

THE AMATEUR-PHOTOGRAPHE

ILLUSTRATED. **PRICE TWOPENCE WEEKLY.**

Biggest, Brightest, Best.

Practical -
Elementary
Pictorial -
Scientific -
PHOTOGRAPHY.

More Illustrations,

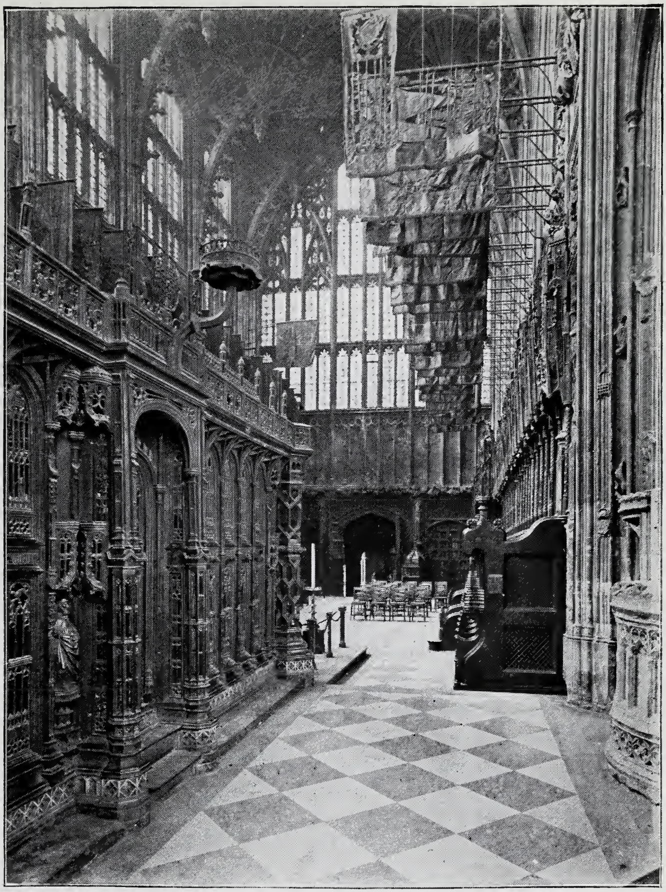
Pages, Information, Competitions and Prizes than any other Paper.

Send Post-card for Free Specimen Copy

to..

51, LONG ACRE, LONDON, W.C.

A Record in Covering Power.



King Henry VII.'s Chapel, Westminster Abbey.

Original taken by W. Rice, F.R.P.S., on a **whole-plate,** with

GOERZ DOUBLE ANASTIGMAT,

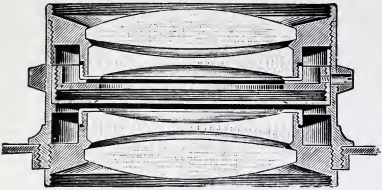
No. 1, at *f*/31, **(the 5 × 4 lens of 6 in. focus).**

The lens was raised about one inch from the centre, thus showing a covering power of more than 90 degrees

"Really marvellous."—*Nature.*

G. P. GOERZ, 1 to 6, Holborn Circus, LONDON, E.C.

GOERZ



Series I.B.

DOUBLE
ANASTIGMATS

PROVIDE FOR EVERY REQUIREMENT
OF THE PHOTOGRAPHER.

❦

Goerz Double Anastigmats, Series 1B, F/4·5 to F/5·5. The Best Lens for all Rapid Instantaneous Work.

Goerz Double Anastigmats, Series III, F/6·8.

The Finest Universal Lens. Definition and Covering Power cannot be excelled. Stopped down and used on larger plates is a perfect Wide-Angle Lens.

Goerz Double Anastigmat, Series 1C, F/6·3.

An excellent Anastigmatic Lens of moderate cost, specially recommended for Hand Cameras.

Goerz Hypergon Double Anastigmat, F/22. The most extreme Wide-Angle Lens yet produced.

Goerz Double Anastigmats

perfectly cover at open aperture the plates for which they are listed.

Goerz Double Anastigmats

Are unrivalled for Definition, Flatness of Field, Covering Power, and all those Qualities which form the Perfect Lens.

C P. GOERZ, 1 to 6, Holborn Circus, LONDON, E.C.

Taken in 1/1000th Second.

with the

Goerz-Anschütz Folding Camera.

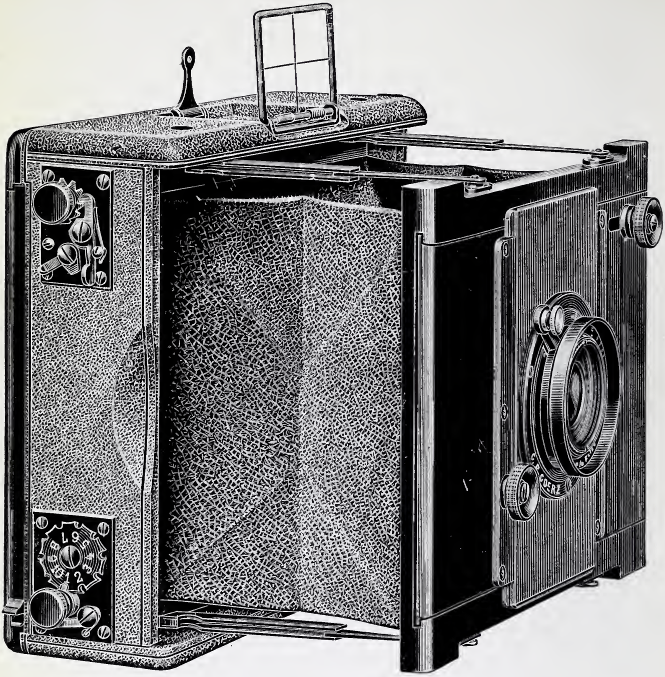
All these Cameras are fitted with the celebrated **Goerz Double Anastigmats.**

For particulars see next page.

C. P. GOERZ, 1 to 6, Holborn Circus, LONDON, E.C.

GOERZ-ANSCHÜTZ

FOLDING CAMERAS



Give Exposures up to 1/1000th Second,

Are the best Cameras for every kind of Photographic Work.

FOR PLATES, FLAT FILMS, OR ROLL FILMS.

Full particulars of

G. P. GOERZ, 1 to 6, Holborn Circus, LONDON, E.C.

THE ACME OF PERFECTION FOR ALL PHOTOGRAPHERS.

CRISTOID FILMS.

"They cannot be over-exposed.
Are simply and quickly developed.
They neither curl, frill, nor blister.
They keep indefinitely in all climates.
They give no halation.
Are faster than any other film.
Their speed being **300 Watkins.**"

SANDELL PLATES

ORDINARY,
MEDIUM AND
SPECIAL EXPRESS,

AT
POPULAR
PRICES.

AND THE

SANDELL PERFECT PLATE

which cannot be over-exposed or give halation.

Complete Price List, Testimonials and Manual free by post,
from the Sole Manufacturers :

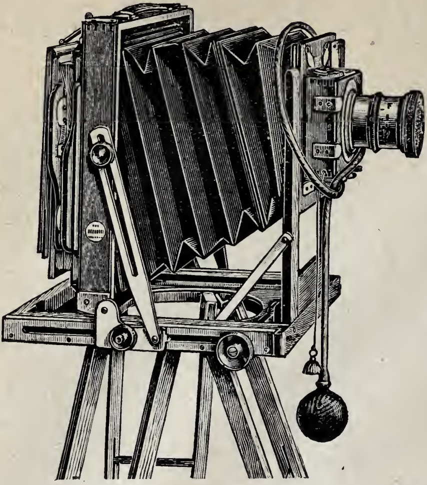
SANDELL FILMS & PLATES, Ltd.,
NORWOOD JUNCTION, S.E.

THE "PEMBROKE" OUTFIT

½-PLATE, 70/-.

The Best
Value ever
Offered!!

Send for
Specimens
done
with this
Outfit!



Mahogany
Camera,
Double
Dark Slide.

R.R. Lens,
with Iris
Diaphragm.

Behind Lens,
Time & Inst.
Roller Blind
Shutter.

Three-fold
Stand, fitting
in the
Turntable of
Camera.

		£	s.	d.
COMPLETE SET AS ABOVE		£3	10	0
Do.	Brass Bound, suitable for all climates	£4	10	0
Do.	Fitted with Bausch & Lomb Unicum Shutter, and Series II. Lens	£5	10	0
Do.	Fitted with our Special No. 2 Hanover R.R. Lens, with Thornton-Pickard Shutter	£5	10	0
Stiff Waterproof Case for above		£0	6	0

To be obtained from all Chemists and Druggists in the United Kingdom.

Sole Proprietors:—

EVANS, SONS, LESCHER & WEBB, Limited,

56, HANOVER STREET, LIVERPOOL and
60, BARTHOLOMEW CLOSE, LONDON.

PHOTOGRAPHY FOR NOVICES.

BARNET SPECIALITIES.

PLATES
BROMIDE PAPERS
P.O.P.
CUT FILMS
ALSO
CARBON MATERIALS.

ROLL CELLULOID FILMS.
GASLIGHT BROMIDE PAPER.
SELF-TONING P.O.P.

ELLIOTT & SONS, LTD., BARNET, HERTS.

BARNET PLATES

ARE RELIABLE
UNDER ALL
CONDITIONS.

CONTACT PRINT
ON

BARNET PLATINO-MATT

BROMIDE PAPER.

Photography for Novices.

The Primus Handbook.

❧

BY PERCY LUND.

❧

Third Edition. **PRICE 1/- NETT.**

LONDON:
W. BUTCHER & SONS, CAMERA HOUSE, ST. BRIDE ST., E.C.
AND BLACKHEATH.
—
1902

CONTENTS.

CHAPTER I.

The Apparatus - - - - - - - - - 9

CHAPTER II.

The Dark-Room or Laboratory - - - - - 38

CHAPTER III.

What to Take, and How to Take it - - - 55

CHAPTER IV.

Negative Making - - - - - - - 80

CHAPTER V.

Print-Making - - - - - - - - - 103

CHAPTER VI.

Trimming, Mounting and Framing - - - 142

CHAPTER VII.

Lantern Slide Making and Enlarging - - 159

Appendix - - - - - - - - - - 177

INTRODUCTION.

❧

THE intention in this little book is to describe practically the elementary processes of photography, in as simple terms as possible, avoiding theory excepting where absolutely necessary, and taking to the utmost extent what is known as the common-sense view of the subject.

Some of the methods advocated will probably be regarded by the critics as not strictly academical: the chemist, for example, may look upon certain chapters as superfluous, and the optician take exception to the brevity of our account of lenses. But our own early days in photography are not yet far removed, and we remember how many of the difficulties which we met with might have been removed by a plain statement of practice, and by avoiding the discussion of theoretical matters that merely act as stumbling-blocks in the first steps of the novice.

But though we have endeavoured to keep to what may be termed a "first year's course," nothing essential has been neglected, and no stone left unturned to instruct the absolute novice in those precise and detailed methods so necessary for success.

When we consider what charming results can be produced by the camera, how fascinating the pursuit of photography is, and in how many directions it may be usefully applied, we can promise those who are just taking it up, and turning over the pages of this manual for the first time, no small amount of enjoyment even in going through the A B C of the subject.

When the rudiments have been mastered and a moderate degree of proficiency attained, then the amount of pleasure will still further increase, and the profit in a dozen different ways can scarcely be reckoned. It is no exaggeration to state that the knowledge and practice of photography adds greatly to the value of human life.

CHAPTER I.

THE APPARATUS.

CHOICE OF CAMERA.—In most cases the would-be photographer purchases his camera before reading anything about the subject. He is fascinated, no doubt, by some excellent outfit at a low price, and buys it without regard to its particular style or adaptability for his purpose. After all, the matter is not of vital importance, since it can be subsequently remedied after a little experience has been gained, when the novice has had time to decide whether or not photography is to become the hobby of a lifetime or of any considerable portion thereof. But if the novice should purchase his text-book before going in for his outfit, or in other words get the horse before the cart, then let us advise him to buy what is known as a *stand* camera, in preference to the seductive and more portable kind carried in the hand. The chief reason for this counsel is that the hand camera has no focussing screen, where the image or picture of the subject or view to be taken can be seen in its reduced size before the plate is exposed upon it. The stand camera possesses this very desirable arrangement, together with several other advantages from the novice's point of view, though the only other to which we propose to draw attention is the stand. When a camera is on a stand it remains rigid; when held in the hand, care is needed in making the exposure, or a slight movement may spoil all.

It will be easy to understand from the above statements that there is an unbridged gap, so to speak, between exposing the plate in a hand camera and developing the negative, across which the photographer must jump. He sees the view that he proposes to take in nature, and by means of a reflecting finder he has a very small image of it before him on the camera, so small, however, that it will be by no means easy for him to observe its details, and form an accurate judgment as to effective selection of point of view, etc. Whereas with the stand camera, as we have already stated, he can examine leisurely upon the focussing screen an image of the landscape having the actual dimensions of the plate he is going to impress it upon, hence he can carefully choose his point of view, move a little nearer or further away from the principal object, observe the details of the scene, and in other ways satisfy himself that he has done the best possible as to selection and arrangement.

When we come to the exposure, the stand camera again scores over the hand variety, for one can give any length of exposure from a fraction of a second up to an hour or two if need be. But even a clever photographer cannot give exposures of more than one-tenth of a second when holding the camera between his hands, whilst very few are able to work effectively at a longer speed than 1-20th. The consequence is, work on a dull day, save in very open country, or in the darker realms of nature, as among the woods and copses, in glens, or again inside houses, is out of the question for the hand-camera man *unless* he can place his camera on some firm object or other, or on the other hand provide himself with a tripod. But if he goes to the trouble of including a tripod in his kit, he may as well go the whole way and at once possess himself of a stand camera, since the difference in weight of the whole kit will not be a great matter.

HAND CAMERA.—Hand cameras are capital instruments as constructed now-a-days, but the novice will probably not achieve the same degree of success right off with one as he would do with a stand camera. But as the embryo photographer will probably have bought a hand camera before he reads these lines, let us tell him what to do in order to become thoroughly acquainted with the working of the instrument before setting out into the field. Stupid mistakes have been made by the impatient, who could not find time to examine their apparatus before going on a holiday. Only a few days ago we heard of a fellow who brought back sixty plates from a tour, and took them to a dealer to develop. There was not an image on a single one of them! The foolish man had never removed the cap from the lens!

There are numerous kinds of hand camera upon the market, but we take as a typical example of the most popular the reservoir hand camera, shown in fig. 1. Note carefully the following instructions:—

Open the "back door" of the camera, which is closed by two small spring catches. The plate sheaths will probably fall out. If not, remove them, so that you can see right inside, and notice the mechanism which releases the plates and works from a little handle outside. Hold the front of the camera up to the light, and looking in at the back, observe the lens aperture, and how, when you turn the diaphragm button, the hole becomes smaller and less light comes through.

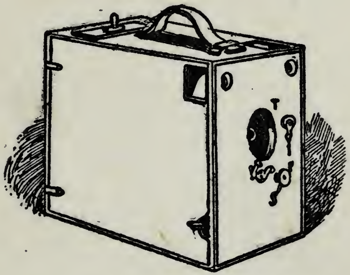


Fig. 1. Reservoir Hand Camera.

Press the shutter release, adjust it for "time" and then for "instantaneous," and notice as you turn the button which quickens the speeds at which the shutter will work, that a speed is soon reached when your eye is scarcely conscious that any exposure has been made at all. You must keep this point in mind when you are actually taking photographs, and not expect to obtain snap-shots indoors at all, or out of doors except when the light is good. After this preliminary examination of the camera, go into the dark-room and fill the sheaths with plates.* Put them back into the camera in the proper order, and closing it up, work the lever that releases them, and drop each one down successively until they all lie at the bottom of the camera.

You ought by this time to be thoroughly familiar with this movement, and commit no bungling when you are out in the field. Now readjust the sheaths (again in the dark-room), and you are ready to actually expose a plate. Go out into the garden or the street, select some bold object, and looking into the finder at the top of the camera front (shading it with the hand if necessary), make sure that this object is about the middle of the field. Be sure and hold the camera level. If you point it upwards or downwards the straight lines of the picture are almost certain to be distorted. Make every effort to hold the camera perfectly steady whilst you are pressing the release. With regard to the speed of the shutter, do not aim at a high speed unless the light is exceptionally brilliant. For street scenes with moving objects about 20 feet from the lens, 1-25th of a second will be about the right thing with the diaphragm aperture marked *f*/22, on a bright day and using plates of medium speed. Now return to the dark-room and complete the development of this one negative before going further. In this way, having gone through the whole procedure experimentally, you will be far less liable to perpetrate those absurd blunders that often accompany the *début* of the amateur photographer, and in some instances have resulted in a great waste of time and material without any good results.

---

* This must be done by non-actinic light. The novice should read Chapter II., relating to the dark-room, before attempting these operations.

STAND CAMERA.—If, on the other hand, the would-be photographer has purchased a camera with bellows and a tripod, in other words a stand camera (fig. 2), then the examination of it should be conducted more or less as follows:—Open the camera out, and be careful not to break the focussing screen. The part which holds the focussing screen is called the back of the camera. It is supported in an upright position by two screws and brass bars. Be sure when setting it up that the screws are in the little niches of these bars, so that the back is perfectly vertical. If at any time when at work in the field you should have occasion to tilt the camera in an upright direction, in order to get in the top of a church steeple or any high building, be sure that the back of the camera remains perfectly vertical, otherwise your buildings will look like fig. 4, instead of as shown in fig. 3 (see opposite page). The focussing screen, with the framework which

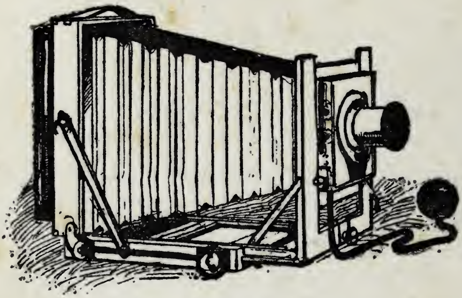


Fig. 2. Stand Camera.

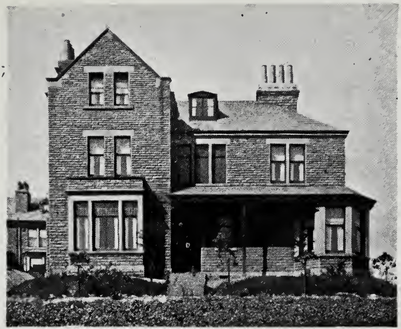


Fig. 3. Swing Back Vertical.

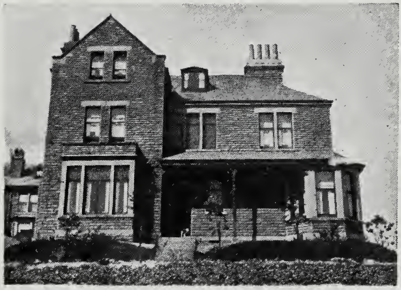


Fig. 4. Swing Back *not* Vertical.

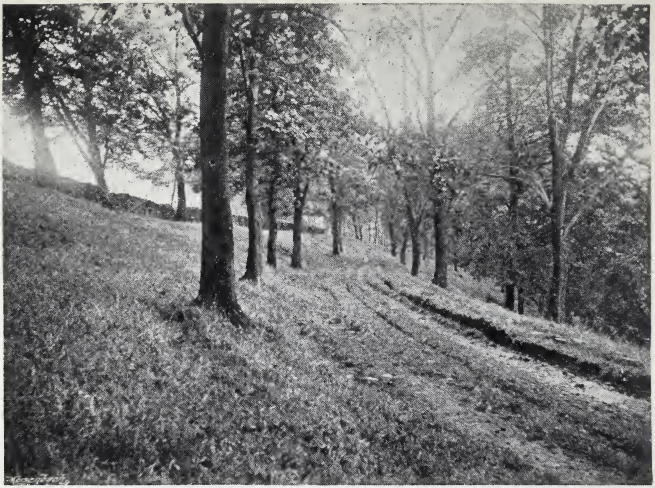


Fig. 8. Wide Angle

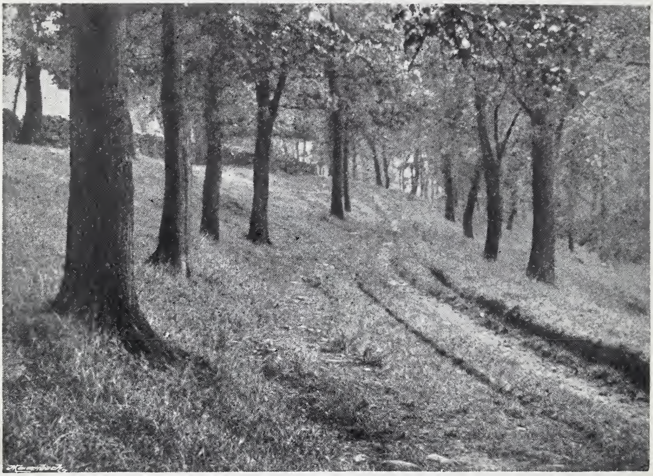


Fig. 9. Narrow Angle.

holds it in position, is removable and reversible for oblong and upright photographs respectively. When changing from one to the other, take care to clamp the catches tightly. Now draw the front of the camera out, and fix it at the end of the grooves by means of the screws at the top. (In some cameras this operation takes place automatically when the front is drawn forward.)

Screw the lens in the flange. Take the cap off the lens, and if there is a shutter, draw the cord until the blind is open. Place the focussing cloth over the camera, and look under *at* the focussing screen, not *through* it. Point the lens towards the window. Turn the focussing screw until the window frame or the curtain is distinctly defined on the focussing screen. The image is always upside down. Put the cap on the lens, or close the shutter. Open the back of the camera by raising the focussing screen, and turn it over on to the bellows of the camera. Draw the cloth closely round the head, so as to cut off all light from outside, and if the focussing cloth is not a thick one, place a shawl on the top. Peer carefully into the camera for a minute or two, to ascertain if it is quite light-tight. The least opening in the bellows or round the lens flange will be sure to spoil your work. If there is a nick anywhere, paste black paper or cloth over it. Mount the camera on the tripod and secure it tightly with the tripod screw. See that the screw does not project so far through the base-board of the camera as to interfere with the racking in and out when focussing. If it does, file or cut sufficient off the tripod screw to prevent this.

Next examine the dark slides, open them and draw the shutters of each in and out once or twice. If they do not work smoothly, rub the grooves with black lead or a soft pencil. If they are not numbered, attach labels to the outside of each, numbering each side, so that you reduce the danger of exposing the same plate twice. Push each slide in turn into its place at the back of the camera. If they do not slide in easily, use the lead pencil on the outer grooves.

Now you are ready for the dark-room, which is described in the next chapter. But before we take up that part of our subject, there are one or two other pieces of apparatus to be dealt with, so that their uses may be properly mastered by the novice. By far the most important is the lens.

THE LENS.—About no part of the photographer's apparatus does so much misunderstanding arise as with regard to the lens. The principles of optics are, of course, not simple enough to be understood in a moment, but it is mainly on account of the wrong way of describing lenses which has been the custom until comparatively recently, that novices get hold of erroneous ideas as to the working powers of a lens, and often fail to understand those essential characteristics which would make its use plain and straightforward.

In everyday language the lens may be described as an optical instrument for focussing the rays of light reflected from objects in a view, and throwing them upon a screen at the back of the camera, which screen is, after adjustment, replaced by the dry plate for the purpose of making the photograph. Photographs can be taken pretty well by a pin-hole instead of a lens, but as the pin-hole is much smaller than the opening of an ordinary lens, it lets less light through, and consequently a very much longer exposure is essential. A larger hole without a lens will not answer, because the rays of light become confused ; the lens plays the part of bringing them to a point, just as the pin-hole does, but it will do it with a much larger aperture, so that it becomes possible to convey to the plate a sufficient impression of light in a second or even very much less time.

Now there are two or three fundamental principles in regard to lenses that we must try to make clear to the reader. We shall do so in the simplest possible language, although it is quite likely the scientific optician may enjoy a covert sneer at us if this book should come into his hands.

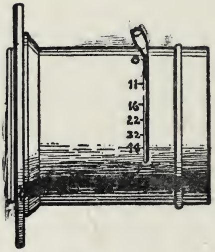


Fig. 5.

Let us take a very common form of lens, an ordinary view lens, as shown in fig. 5. It will be seen that it consists of a sort of tube of brass, perhaps an inch and a half or two inches long. At each end there is a projecting rim or flange. Near the centre of the tube is a little mechanical contrivance by which the opening through which the light passes can be made smaller or larger as the case may be. This is called an iris diaphragm (see fig. 5). There are still a great many lenses on the market which have, instead of the iris diaphragm, loose stops of different sizes which are inserted in a slot; but the iris diaphragm is very much more convenient, because it is a fixture, and there is no risk of losing any portion of it or leaving it at home, as in the case of the separate stops.

You will find that you can screw off the flange at each end of the lens tube. That at the front is simply to give a finish to the lens, whilst that at the back contains the actual glasses of the lens.

First, however, let us consider the aperture of the lens, that is, the size of the opening when the iris diaphragm is at its greatest extent. Now it is upon the size of the aperture yielding a clear image that the speed of a lens depends, and not upon any other detail in construction. As great care in making and a special quality of glass are required in producing lenses that will give clearly defined images with large apertures, one may say roughly that the larger the opening the greater the cost of the lens. Impress this fact upon your mind then—lenses having the same effective working aperture are all of the same speed.* We often hear men saying what a quick lens they have got, compared with Mr. So-and-so's, and upon investigation the statement proves to be pure nonsense, for the effective aperture in each case is exactly the same.

Now to explain the use of the iris diaphragm. If we take a camera in which such a lens as the above is fixed, and focus an image of any object quite close at hand, say a tree in any landscape, we shall find that with the full aperture of the lens all distant objects will be blurred and indistinct, but as we close the diaphragm and make the aperture gradually smaller, we shall notice that although less light comes through, nevertheless there is greater depth of focus, as it is called ; that is to say, in following up the above experiment, objects in the distance can be brought up much more clearly. Thus we learn that the smaller the opening, the sharper and more general the focus. At the same time, it must not be forgotten that the smaller the aperture the longer the exposure will have to be. These are points which will be much better understood if the photographer has sufficient patience to go through with them in actual experiment. In the case of the man who possesses a hand camera with a lens in which the size of aperture has been fixed beforehand, he has little or no jurisdiction over his lens, so that the foregoing and succeeding observations will not have much interest for him. The only important thing to impress upon his mind is that in order to secure a fixed focus the working aperture of his lens has had to be reduced considerably. He must not expect, therefore, to get good photographs except under good conditions of light.

---

* That is, provided they have also the same focal length. See a later paragraph dealing with focal length.

But for the photographer who uses a stand camera, there is something more to be said upon this subject.

The first question to ask is what sort of subjects is the lens required for, and in ninety-nine cases out of a hundred the answer would be "for everything," portraits, landscapes, architectural subjects, interiors and exteriors. What then is the most suitable lens for all-round purposes? We may say that no one lens can possibly meet all these requirements, so the photographer must possess himself of a battery of lenses.

Casket Lenses.—These are actually to be had in what are called casket sets, that is to say, a little case containing a lens mount or tube with an iris diaphragm in the middle of it, and several small lenses of different kinds ready to be screwed into this mount. Some of the more expensive sets have six or even eight lenses; but let us speak of the simpler and cheaper kinds throughout our remarks, because for all intents and purposes a casket containing four different lenses supplies the photographer with all he needs. Such a set can be had for the modest sum of £2, and we might mention that many of the illustrations in this book have been taken with a casket sold as the "Primus." Let us suppose the photographer has purchased one as shown in fig. 6. Examine the rims of the four loose lenses, and you will find figures marked upon the margin of each. These

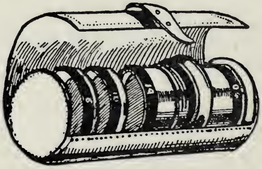


Fig. 6.

denote the focal lengths of the particular lens, and what that means we shall have occasion to explain directly. These lengths will probably be respectively 6, 10, 14 and 20 inches. Having fixed the flange into the front of your camera, which we will suppose is half-plate size, take the lens tube and screw in at the back the six-inch component — the shortest in your set. Next screw the lens tube into position in the camera, and putting your head under the cloth, focus upon some distinct object in the distance. If you are indoors, a building across the street or a tree in the garden will answer very well; then, measuring the distance from the diaphragm of the lens to the focussing screen of the camera, you will find it to be approximately six inches. This in plain language, then, is the focal length of the lens. If you want to thoroughly understand the capacity of your casket set, take a negative now with the six-inch component in the camera. The field included is a wide one—in fact, a six-inch lens in a half-plate camera would be called a wide-angle, though the term is somewhat elastic. Now, taking out the 6-inch component, put in the 10-inch and so on, making an exposure with each one in turn. Probably your camera will not rack out sufficiently far to enable you to use the 20-inch lens singly. That does not matter a bit; it will be used in combination, as we shall explain shortly. You will, however, have three negatives, from which it will be advisable to make prints for purposes of comparison.

You will then find that the longer the focus of the lens you use the smaller will be the field of view included, but the larger the objects in that field. To take an imaginary case: Suppose your view is of a row of houses a hundred and fifty or two hundred yards away. The 6-inch lens will probably include about forty of the houses; but they will appear very small in the photograph, looking like a narrow band across the centre of the plate. Putting in the 10-inch lens, you will very likely find that only about thirty of the houses are now in the field of view, but that they are at the same time appreciably larger. Likewise, in the case of the 14-inch lens, no doubt only some twenty houses will come into the field of view, but they will be very much larger in size.

Here, then, you have learnt a very valuable lesson in regard to lenses. You will have clearly understood by actual experiment that the greater the focal length of the lens the smaller the field of view included. What an advantage a lens of this kind is in actual practice! You go out into the field and see some subject which strikes you as pleasing. You put in, say, the 14-inch lens, but, looking on the screen, you find perhaps that some graceful tree or some noble rock is just outside the field of view. If it is inconvenient to remove the camera to a greater distance in order to take in a larger field, all you need do is to put in the next lens of shorter focus—the 10-inch—and this will in all probability enable you to include exactly those objects that you wish. And so one may go on fitting in longer or shorter focus lenses to include a lesser or greater angle as circumstances may render desirable.

But you must also notice another point—that the longer the focus of the lens, the greater the distance the light has to travel before it reaches the plate, and therefore there is a corresponding diminution in its intensity. In practice this means that the longer the focus of the lens the longer the exposure must be to secure a perfect negative.

So far, then, we have described only the uses of the separate components of our casket set in their single form. We have now to consider what can be done with them when two are used simultaneously—one at the front of the tube, and one at the back. When employed in this form the whole lens is called a doublet or rapid rectilinear. Do not imagine from this name that there is any increase in rapidity by using two lenses in this way. There is absolutely none; a single lens working at the same aperture is just as quick as a rapid rectilinear. But a single lens has one drawback which prevents its use, in the case of architectural subjects especially—the tendency to distort the perpendicular lines of any building, and to impart to them curves which they do not possess in reality (fig. 7). Such distortion is not visible at all in pure landscape, or in any

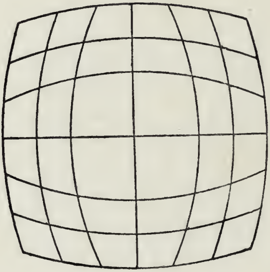


Fig. 7. Effect of Distortion.

view where the cottage or houses only occupy a comparatively small proportion of the field; but when we come to take a photograph of a church or a cathedral, either an exterior or an interior, then it is essential that these lines shall be straight, exactly as they are in reality. Now, by putting two lenses together as described, one corrects the faults of the other, and we get a straight-lined or rectilinear image. A table is usually supplied with the lenses showing what different combinations are possible. The longer focus lens is always placed at the front, the shorter at the back. If we put the 20-inch lens at the front and the 14-inch at the back, we shall get a rectilinear of approximately 8½ inches focus; if we put the 14-inch lens in front and the 10-inch at the back, we shall get a lens of about 6¼ inches focus. The 10-inch with the 6-inch gives 4 inches focus, a very wide angle and a useful lens for small interiors or narrow streets.

Let us now refer the reader to the two illustrations (figs. 8 and 9, opposite p. 17). The first was taken with a lens of 4 inches focus, that is, a very wide angle; the second with one of 14 inches focus, or narrow angle. The position of the camera was not altered in the least between one picture and the other beyond the necessary movement of the front in focussing. The former, of course, includes a much larger field than the latter, but in this particular subject the narrower angle view makes a more pleasing picture. The importance, then, of having lenses capable of including various angles will be obvious.

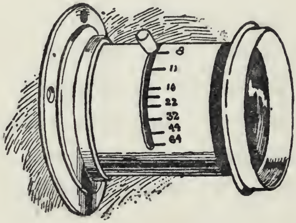


Fig. 10.

Now, the different kinds of lenses that one can make with a combination set such as we have described can be bought separately, and if the photographer does not go in for such a set, then the most useful all-round form of lens is the rapid rectilinear (fig. 10). These can be bought at all prices, from about 21s. upwards. This form of lens is suitable for buildings, landscapes or portraits. It can be used as a single lens by screwing out either the front or the back component (preferably the former), provided always that the camera will rack out sufficiently to admit of the greater focal length of either component used singly. For by treating a rectilinear or doublet lens in this way, the focus is usually doubled; if the united components have a focal length of 7 inches, either of the single portions will probably be 14 inches. Some cheap cameras unfortunately are not provided with sufficient length of bellows to admit of the above-described procedure.

When the photographer buys a hand camera the lens is part and parcel of the instrument, and as a rule no separate choice is given to the customer: he takes lens and camera together. This is also the case when buying a stand-camera outfit—"camera, lens, tripod, etc., complete." Now, these stock goods or regular lines of the dealer are, as a general rule, fitted with lenses that err in the direction of being too short in focus, and hence including a wider angle than really desirable for the best effects. It is easy to understand why manufacturers prefer short-focus lenses: they require shorter-bodied cameras, and they are quicker than those of long focus.

But if the purchaser is buying his lens separately, it will be well for him to see that he obtains one of focal length not shorter than the longer diameter of the plate he is using. For example, a quarter-plate camera should be fitted with a lens of not less than 4½ inches focus, and preferably about 5½ inches. A half-plate camera should have a lens of not less than 6½ inches focus, and preferably 8 inches. For all-round landscape work, such as ordinarily practised by the amateur, lenses of these focal lengths give an angle more nearly approximating to that included by the eye.

Special so-called "portrait" lenses are to be had, but their only essential difference from the ordinary kind is that they work at a larger aperture (and are consequently more expensive), so that the exposure in a studio or room shall be reduced to a minimum.

Supplementary magnifying lenses are now sold for fitting in front of ordinary lenses. They serve to lengthen the focus, and so make the field of view smaller, but objects in that field correspondingly larger. These are useful to photographers whose lens is of shorter focus than they find after experience to be desirable.

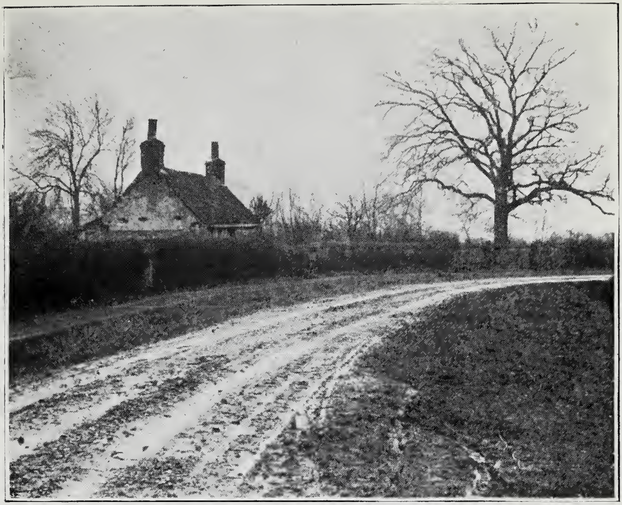


Fig. 24.

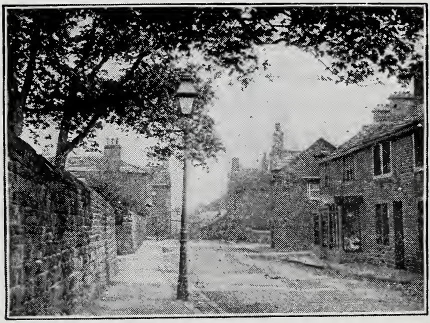


Fig. 25.

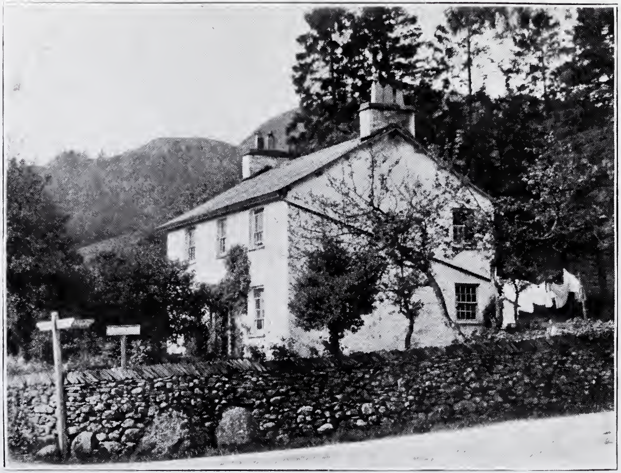


Fig. 27.

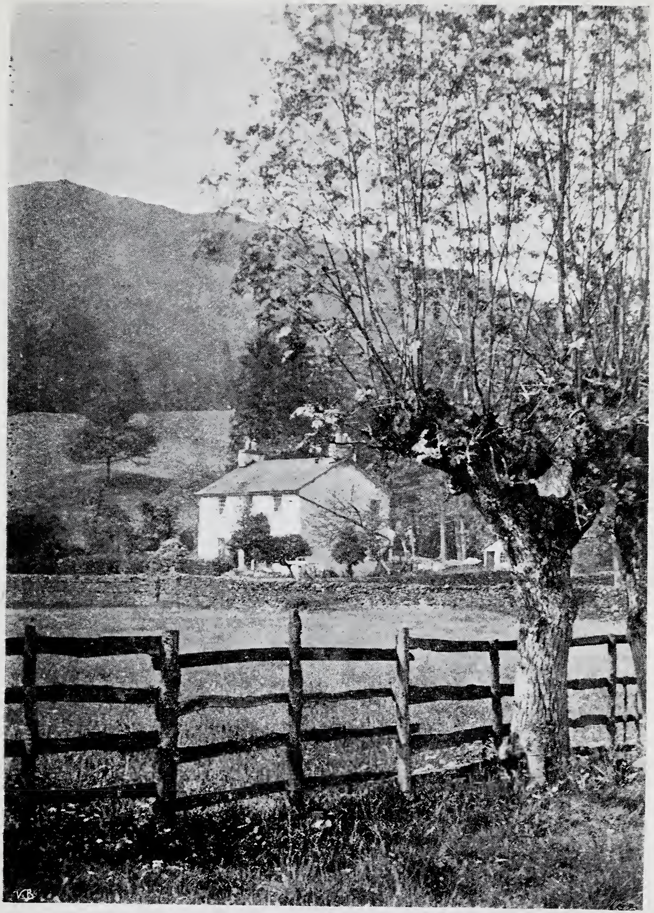


Fig 28.

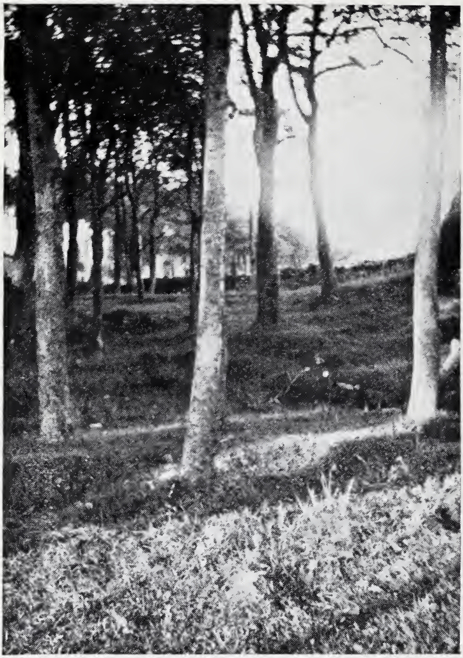


Fig. 29.

A lens is a delicate instrument, and should be handled carefully. The glasses should be wiped from time to time with a soft linen handkerchief, and the lens kept in a little padded case when not in use. We shall have more to say about lenses when we come to deal with outdoor work.

TRIPOD.—Little need be said about the form of tripod stand. Almost every make upon the market is good of its kind, the great aim, of course, being portability; but at the same time rigidity must not be sacrificed to portability. We advise the photographer to become possessed of a three-fold tripod rather than one with only two folds. The lowest segment should, of course, slide so that the camera can be adjusted to different levels according as circumstances may demand. The tripod should always be shut up when not in use, as if left open (especially in a dry room) it may become warped.

THE SHUTTER.—In photography some little confusion is apt to arise in the clashing of terms, and the student must not confuse the shutter of the dark slide with the shutter which fits in front of or behind the lens, so as to adapt it for instantaneous work. There are numerous patterns of shutters upon the market, and the best pattern—the roller-blind with pneumatic release—can now be bought at a comparatively low price. If the photographer has purchased a complete outfit, in all probability his camera will have a shutter fixed to the front of the camera behind the lens; if not, then he may buy one separately, and fit it to the flange of the lens when required. An illustration of the roller-blind shutter is to be seen in fig. 11. It will be noticed that the speed can be adjusted by means of a milled screw, and that the movement of the shutter may be altered to a given time exposure or instantaneous exposure by merely pushing the lever on from one catch to another. Although the student is advised not to attempt instantaneous work at first, the shutter can be advantageously used for time exposures, as it is

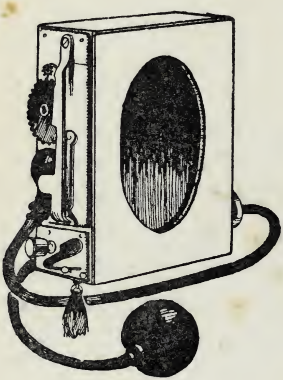


Fig. 11.
Roller-Blind Shutter.

so much easier to squeeze the ball than to remove the cap of the lens.

Focussing Cloth.—In using a stand camera a focussing cloth is employed to put over the head and shoulders, so as to exclude the light from behind and enable the observer to see the image distinctly upon the ground-glass or focussing screen. The focussing cloth should be about three feet square, and may be made of any black, opaque material, preferably waterproof. Focussing cloths are sold by most dealers, but one may be readily made at home if desired.

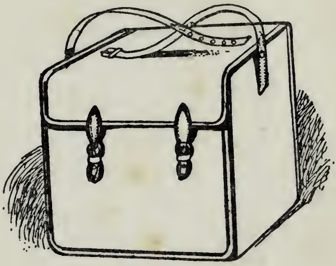


Fig. 12. Camera Case.

Camera Case.—Hand cameras are, as a rule, carried about without cases, though it would be better to have some simple kind of canvas-cloth cover with a strap to put round the shoulder to protect the camera in the event of rain, and to relieve the hand, which may become fatigued by carrying it for any length of time. With a stand camera, however, a case is practically essential. The usual form consists of a square oblong box shape made of waterproof canvas, with a broad leather strap to go over the shoulder (fig. 12). Inside there should be a division to separate the slides from the camera, and a little box for the lens. Solid leather cases of a similar kind are also obtainable. But the best sort of bag for carrying a camera a long distance is known as the Alpine Rücksack (fig. 13), which has unquestionable advantages over the ordinary pattern of camera case. The two straps, as will be seen by the illustration, go over the shoulders and under the arms, so that the chest is left free. There is therefore great comfort in carrying, and a much heavier weight can be taken without fatigue. Since the bag is, as its name implies,

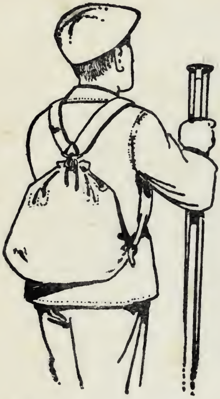


Fig. 13. Rücksack.

actually a sack, it is advisable to place the camera in one light cardboard case covered with cloth, and the slides in another. This will prevent their rubbing against each other and becoming scratched or damaged. Small loops may be fastened outside the bag, to which the tripod can be attached with short straps.

Before purchasing apparatus it is always advisable to consult a photographic friend, if you have one; if not, then take the advice of a respectable dealer in photographic apparatus. Above all, until you have had experience, do not buy second-hand apparatus because it is cheap. If you consult a dealer, and explain to him how much you wish to spend and what your requirements are, he will, in the interests of his own business, sell you something that will give satisfaction, and you will find his advice and instruction most valuable in the initial stages. But remember that the dealer is often a friend in need, and carefully avoid over-taxing his time and patience.

We have so far considered, broadly speaking, only the apparatus required in the field. In the next chapter we shall deal with minor apparatus and materials needed for that portion of the work which is done at home.

CHAPTER II.

THE DARK-ROOM OR LABORATORY.

❧

TEMPORARY DARK-ROOM.—For the manipulation of dry plates, etc., which are exceedingly sensitive to ordinary white light, a so-called dark-room is required. It is not absolutely dark, but must be lighted with red or yellow light only, colours which have little or no action upon photographic plates unless prolonged for a long time.

Where it is possible to set a room apart for the dark-room and laboratory it is, of course, most desirable that the photographer should do so, especially if he is an enthusiast, and wishes to go pretty deeply into the subject. But, on the other hand, no one need be deterred from purchasing a camera and going in for photography because he has no spare attic or cellar or closet in the house, which could be conveniently adapted for the purpose. For now-a-days, when photographic manipulations are much less numerous and complicated than they used to be, it is even possible to make use of the dining-room or the library for development and printing, without risk of spoiling the furniture or the carpet. But because of the necessity of clearing everything away after each set of operations, it is well, when one can, to arrange for a dark-room—temporary or permanent—in some other part of the house, where things may be spread about a little more, and where neither the necessity of exercising caution lest some spill should occur and damage the carpet, nor of "tidying up" every time work is over for the nonce are never-to-be-forgotten obligations.

For a temporary dark-room the best situation is undoubtedly the bath-room, which often proves a capital place, especially if it should contain a lavatory basin with a cupboard below, of which some portion, at any rate, can be utilized for dishes, bottles, etc. A pantry, if there be a sink in it, answers equally well. It is usually a very simple business to convert an ordinary bath-room or pantry into a temporary photographic laboratory.

The first thing necessary is to make a contrivance for blocking up the window. Towards this end a light framework must be constructed of four laths or thin pieces of wood and one or two cross pieces exactly the size of the window recess. The cross pieces are to strengthen the framework, and only in the case of a large window need there be more than one. Upon this framework fasten with tacks two or three thicknesses of stout brown paper, letting them wrap over the edge to make a pad, so that the framework may fit tightly into the window recess and exclude all the light. In order that the framework may fit with the greatest precision, strips of green baize or some other soft material may also be fastened round the edges. About six inches from the lower extremity of the framework fasten with gum or paste a strip of stout canary paper, such as the photographic dealer sells, about six or eight inches wide, consisting of two thicknesses. Carefully fit the brown paper over its upper and lower extremities, so that no white light can get in. This is your non-actinic window.

Two thicknesses of the yellow paper are quite safe for ordinary plates, but if at any time the sun should shine directly on the window, it will be an easy matter, as well as a desirable precaution, to put an additional thickness of the paper temporarily in front of the other two. This loose light screen can be held in place in the window, if it does not jam up tight enough by itself, by a stout nail projecting on one side of the recess, behind which one side of the framework is pushed every time it is placed in position.

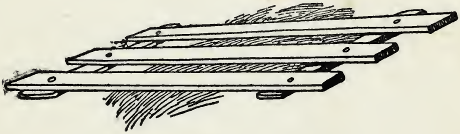


Fig. 14.

Another little bit of joiner's work is desirable in order to facilitate our manipulations. Nail a few strips of wood together at right angles to each other, so that they will rest upon the edge of the wash basin (fig. 14). This is to be the developing table, so that if any solutions are spilt they fall on to these cross pieces, and then into the wash basin, and not on to any woodwork at the side. Just leave enough room to get to the tap, so that you can fill a measuring glass or a dish with water during operations. If there is not space on the cross laths for all the dishes you are using, an old tray, or a wooden one specially made, is a decidedly useful acquisition: an old box lid will do at a pinch. To work by night artificial light will, of course, be needed, and a cheap but excellent lamp can be constructed with a sheet of canary paper and two or three pins. Fold the sheet to double, and then roll it round in the form of a cylinder, pin the ends together, place this cylinder over a candle, and cover the top, all but a small chink for ventilation, with a folded newspaper or anything which comes handy, and there you are, a dark-room lamp at a cost of threepence!

For those who work in temporary laboratories the use of ready-made solutions and chemicals in a compressed or tablet form is desirable; they can be obtained almost anywhere.

Never be without an old duster for mopping up, and be careful not to touch the household towels with fingers that have been immersed in pyro or any rapidly oxidizing solutions, but keep a special old towel for the purpose. A piece of waterproof American cloth is uncommonly useful for spreading upon any table, affording an excellent protection against accidental spills, and being easily wiped over when the work is at an end.

PERMANENT DARK-ROOM. — Some of the advantages of a permanent dark-room have already been mentioned, the most important being the saving of time in clearing away on each occasion. There are few houses where an attic or cellar cannot be spared for the purpose, the former being preferable because of its dryness. Failing either of these a large closet under a staircase, or some place of that kind may be requisitioned. We recollect our own first dark-room. It was a small attic, occupied by the hot and cold water cisterns of the house, and having one small glass slate window in the roof. This was blocked up with two thicknesses of canary paper, an indiarubber pipe with one end in the cold cistern served as a syphon for the supply of water, whilst waste had to be carried away in a pail. The lids of the cisterns acted as shelves, whilst a rude table was constructed from boards and boxes. The arrangements were rough and ready, but answered the purpose well enough.

For the benefit of those who are more ambitious and wish to fit up a thoroughly efficient dark-room, fig. 15 may be recommended as an ideal arrangement, which may be approached as closely as space and other considerations admit. The illustration is almost

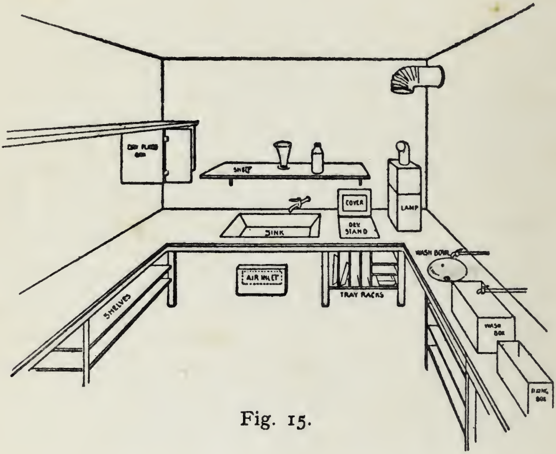


Fig. 15.

entirely self-explanatory, but we quote a few words of description by the photographer who drew this plan.*

"In the left-hand corner, at a convenient height above the table, fasten a dry plate storing box, large enough to take the largest size of plates used. Make this box perfectly light-tight. Line it with black velvet or felt, and have door fitted with spring so as to keep it closed." Ventilation is an important consideration in the dark-room, but most photographers overlook it entirely. If there is a chimney in the room the natural ventilation afforded will probably be sufficient. If not, then a few holes should be bored in the door at the top, and a short curtain hung outside, a few inches from the door, to prevent the ingress of white light.

---

* Mr. James Slack, a contributor to the *Photo-Beacon*.

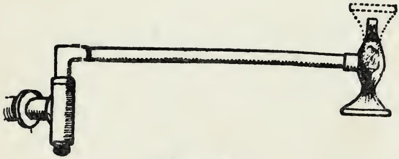


Fig. 16.

We will now enumerate other conveniences from our own experience. The sink is an important item. We have one ourselves of yellow stoneware—measuring 39 by 21 inches, and 5 inches deep inside and costing about twelve shillings. For developing, the trays can be supported upon a wooden cross-piece made of strips of wood, as previously described, and resting on the edges of the sink. The sink should preferably be fitted with two taps, one being of the ordinary kind, whilst the other has a long arm, the water coming on as it is swung outward (fig. 16). By reversing the end a spray or a fine jet for filling bottles is given. Failing a supply of running water an old filter or a stone beer jar may be utilized for the water supply.

At each side of the sink there should be wooden side tables for sundry operations, and below the sink racks for large dishes. Behind and above the sink, one or two narrow shelves for the developers and solutions most frequently used ought to be provided, and these particular bottles should always be kept in the same places, so that one can readily put the hand upon them when working in a dim light.

DARK-ROOM LAMP.—We have already described how to make a cheap form of dark-room lamp that may be employed equally well with a candle, an oil-lamp or gas. But possibly the amateur will prefer to buy one of the numerous patterns upon the market. That being so, our advice is, get a large one whilst you are at it. The small lamps are apt to burn badly, to smell, to let out light, or to prove in some way defective. Such a pattern as that shown in fig. 17, costing three or four shillings, is the cheapest that should be purchased, but if the purse will afford it, it will probably be good policy to get a large lamp costing ten shillings or even more. For ordinary brands of plates a yellow light is perfectly safe, though one need not approach very closely to the source of light when developing. For specially rapid plates, ruby light must be employed.

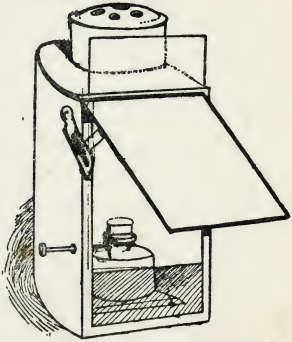


Fig. 17.

Dishes, Trays, Tanks, etc.—Three or four celluloid trays for developing, etc., are essential. For the operations of toning and fixing, intensifying and reducing, porcelain dishes should be chosen. The hypo dish should be large enough to hold two or four plates alongside each other, and it should never be used for any other process. Dishes should be kept very clean, and well washed after use, occasionally with hot water.

For washing negatives after they have been fixed, special racks and tanks may be obtained fitted with a syphon, so that half-a-dozen or more negatives may be washed simultaneously. The tank is put under a tap flowing gently. As soon as the tank fills the syphon acts and empties it, when the filling begins again, and washing is thoroughly accomplished in half an

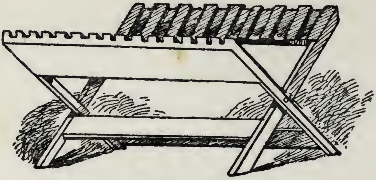


Fig. 18.

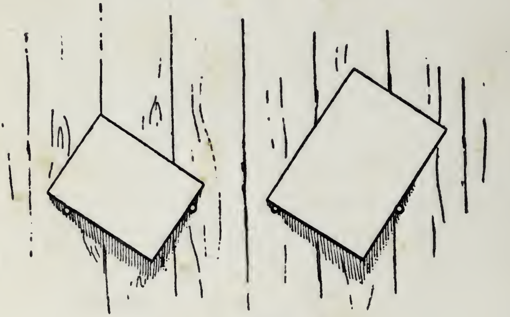


Fig. 19.

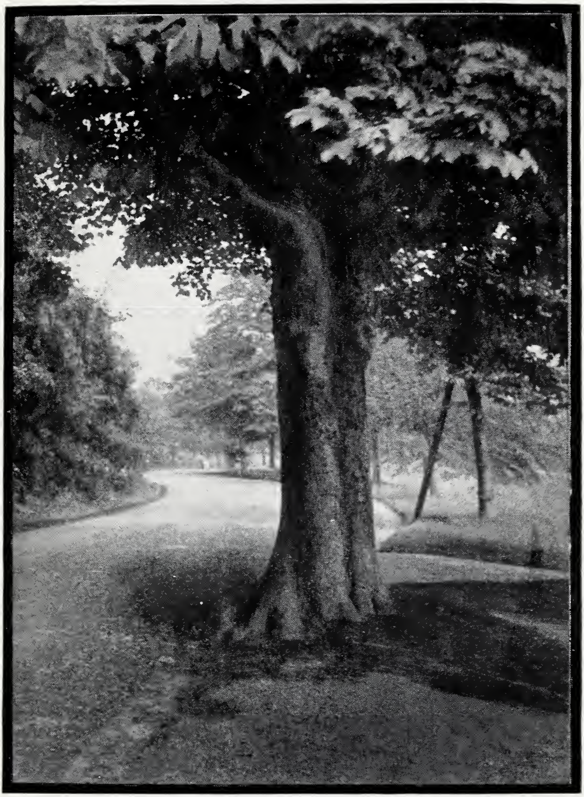


Fig. 30.

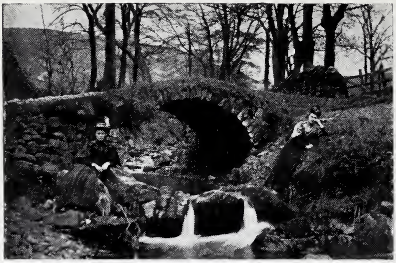


Fig. 31.

Fig. 32.

hour or so. A draining rack (fig. 18), into which the negatives are placed until dry, is a very useful piece of apparatus, though not absolutely essential. In default thereof nails may be driven into the wall or into a board leaned against the wall, as shown in fig. 19, and the plates, film inwards, rested on them. They will dry more quickly in this fashion than in an ordinary rack.

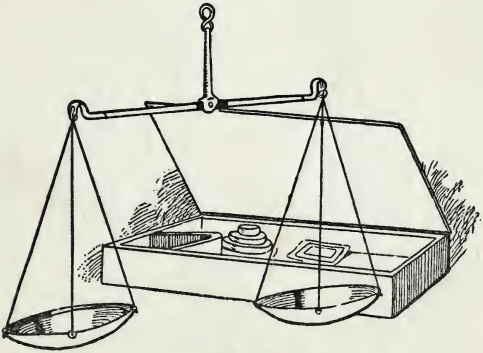


Fig. 20.

Scales, Fluid Measures, etc.—To weigh out small quantities of chemicals, a pair of scales (fig. 20) is desirable, though it may be dispensed with by the previously mentioned expedient of buying them in the tablet form. But sooner or later the photographer will be sure to want scales, therefore since they cost so little (about two or three shillings including weights), he may as well have them at the outset. Those with loose glass pans as in the illustration are the best, because they can be readily kept clean. Graduated measuring glasses for fluids (fig. 21) should be purchased

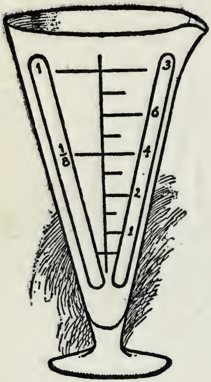


Fig. 21.

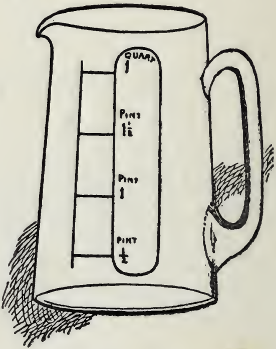


Fig. 22.

with the quantities marked both in metric and English measure, since many formulæ are now given in metric quantities only. The following set of sizes may be recommended :—One 2-oz., one 6-oz., one 10-oz. and also a graduated jug to hold one quart (fig. 22). The photographer should also possess himself of a few empty bottles, stoppered and corked, say a dozen in all, varying in capacity from 6 ozs. to a quart, some wide and some narrow mouthed. A larger bottle still, with a wide mouth and cork, will serve to contain the fixing solution, or an old filter makes a capital receptacle when fitted with a wooden tap as used for beer barrels. Small "dropping" bottles (fig. 23) are very handy for 10 per cent. solutions, especially for potassium bromide, the "restrainer" for over-exposed negatives, and the photographer will do well to purchase at least one of these. Dry hypo may be kept in a large pickle or sweet bottle, having a glass stopper and the neck lined with cork. We cannot be too emphatic in urging the photographer to label every bottle, whether they contain dry substances or solutions. Label books may be bought for a few pence, and for acids the bottles with indelible labels etched upon them are a great convenience. Finally a scoop or spoon for lifting out dry chemicals will be found very handy, and the last item we need allude to now is an ebonite or celluloid plate lifter to raise the negative out of the developer.

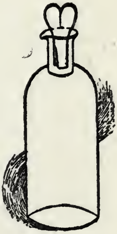


Fig. 23.

Other small items will be wanted when the photographer gets to the stage of printing from his negatives, but these things will be described as we come to them in later chapters.

Putting Plates in the Slides.—Now we are practically ready to prepare for an exposure. Sensitive dry plates may be bought at every photographic depôt. All the regular makes are good, and the novice is particularly advised to obtain those of ordinary speed (unless he is working with a hand camera), for very rapid plates require greater care in putting in and developing owing to their extreme sensitiveness; moreover, they admit of less latitude in exposure.

Having procured a packet or two of plates (the packets contain a dozen) close the door of the dark-room, and as soon as the eyes have become accustomed to the non-actinic light, tear the outer paper from one of the boxes, and lift the lid. The plates will be found two and two face to face, wrapped in brown paper. Take out a couple and place them in the dark slide, minding that the film side is outwards, as negatives taken on the wrong side of the plate are useless. It is easy to tell which is the film side by examining the plate quickly near the ruby light or by gently feeling at it near the margin with the finger. The glass side reflects more light than the film side. The film side is something like smooth indiarubber, while the glass side is smooth and slippery. However many slides you have to fill, of course, the procedure is the same. Do not omit to wrap up the plates remaining in the box and replace the lid; also see that the slides are tightly closed before you open the dark-room door.

Sundry tables of weights and measures, notes, etc., for dark-room use will be found in the Appendix. With the question of exposure and how to proceed in the field we shall deal in the next chapter.

So much, then, for the laboratory or dark-room. A word of caution in conclusion. See that no white light penetrates through chinks or round the doorway. Stop up all holes by pasting brown paper over them. Provide yourself with a stool or chair, so that you may be comfortable, for it is probable that you will spend, as we have done, many long hours between those dark walls, by the dim light of the yellow lamp. How often have we anxiously watched for the first appearance of an image on the plate! How frequently and sadly have we tossed our failures into the rubbish box! But the successes have far outweighed the failures, and when we look back to the work of years gone by we feel that we owe not a few of the higher pleasures of this life to work done in the dark-room.

CHAPTER III.

WHAT TO TAKE, AND HOW TO TAKE IT.

The First Subject.—It would not be advisable to enter very deeply into the principles of art as applied to photography at this stage of the amateur's career, besides being out of the scope of this little book. He is by no means prepared for it until the technical difficulties of the process have been overcome, and the manipulations of the camera, together with exposure, development, and printing, have become as easy and habitual as putting on one's clothes. To attempt too much in the earlier stages of the photographer's career would mean taking all the pleasure out of the pursuit. He must learn how to get on his feet and toddle before he acquires the art of walking gracefully.

But in order to start him on the right path we propose to give, as we go along, a very brief outline of the main artistic considerations that enter into the production of pictures by photography. It is our intention to suggest to the reader what he should take and how he should take it, adopting a method of teaching elementary photographic art that we have found from experience to be far and away the most satisfactory—that is, by putting before the reader illustrations and criticising them; showing on the one hand their good features, and on the other their faults, and advising how they might have been avoided. For although picture-making, in the fullest sense of the word, is a special application of the camera, yet there are very few photographs of any kind that are not capable of being made more pleasing by a knowledge of at least the main principles of pictorial art.

The beginner who is ready with his camera to take a photograph for the first time, will be almost certain to make a wrong choice of the subject, and single out something by no means easy of treatment—as, for example, a portrait or a snap-shot of moving objects. The proper thing, however, is to choose a very simple subject, such as a house, a tree, a barn or a country lane, like the picture illustrated in fig. 24 (see opposite page 32).

Do not place the camera exactly in the middle of the road, and so divide the scene up with mathematical accuracy, but move a little either to one side or the other, so that the foreground shall not be entirely occupied with its bare, uninteresting white surface. Take care to spread the camera legs fairly widely, to avoid accidentally upsetting the instrument, and be sure it is perfectly level, or the picture will be crooked on the plate and the cottage toppling over either one way or the other. Any trifling error in levelling can be remedied in trimming the print afterwards, but it is just as well to get the lines straight or as near right as can be in the first instance.

If the image appears to be too high or too low on the screen, elevate or lower the sliding front a trifle, or slightly move the front leg of the tripod outwards or inwards, until the exact position is attained. It must be borne in mind that theoretically the camera should not be tilted at all, but remain horizontal. Still, if it is necessary to do this in order to get the picture properly adjusted, the swing-back should be brought into play to compensate for it, so that whether the camera is pointed upwards or downwards the swing-back must remain quite perpendicular.

Now, see that you have arranged the sky and the landscape in reasonable proportion. As a general rule the horizon line should not be exactly in the centre of the plate, but a little above or below it, whichever appears best. Do not hesitate to look at the picture from several points of view; not infrequently a movement of a yard or two to right or left will improve the picture immensely. Focus on the foreground, or the principal object, if it is not many yards away. In the case of our example the best place to focus upon is the roadway.

The next thing is to take care that in drawing out the shutter of the dark slide you do not move the camera from its position. If this should happen, shut the slide again, take it out, and examine the view once more on the ground glass, to be quite sure all is right.

EXPOSURE.—Here we have to consider an important proceeding, and one which involves the beginner in some little difficulty. In each lens, as we have already explained, there is a movable diaphragm, or a set of loose stops, with which the aperture of the lens can be made smaller. The use of a diaphragm is to concentrate the focus of the lens, and so make it give a better definition round the margin of the view than it could do at full aperture, whilst at the same time everything in the field is brought out in sharper focus.

Nothing teaches like experience, hence the best advice we can give a novice is to make a trial exposure with the lens at full aperture before bothering as to which size of diaphragm is actually the best to use for the particular subject. For our first attempt we may safely set the shutter to $\frac{1}{10}$th of a second.

Having made this trial exposure, and developed it according to the instructions given in Chapter IV., the student will be prepared to go further into the subject of diaphragms. Let him now focus again on the same subject as the trial exposure, and put in this time, or adjust the iris, as the case may be, to *f*/32, noticing the difference it produces on the ground glass. Although, of course, the light is diminished, yet definition at the margin of the picture is much clearer. If, for instance, you focus on an object ten yards away, objects five yards away will appear somewhat blurred; but when you make the aperture smaller things seem to level up more evenly, whilst, if the aperture be made still smaller again, the whole of the field of view will be almost equally clearly defined.

In focussing the principal object the foreground should also be well defined, the other parts being left to take their chance if stopping down, as it is called, does not bring them out clearly. The smaller the lens aperture the greater the exposure required. The stop to use as a general rule is one which gives fair definition without too much biting sharpness. For a panoramic view all possible detail is usually required: one may then make the aperture as small as the diaphragm will admit.

The diaphragms are usually graduated and marked *f*/8, *f*/16, *f*/32, *f*/64, and so on. The Royal Photographic Society has fixed a standard of lens apertures, and these markings represent a mathematical relation between the focal length of the lens and the aperture. The subject is too technical to fully discuss in a handbook for novices; suffice it to say here that, if with the diaphragm aperture marked *f*/8 a given view is sufficiently exposed with one second, aperture *f*/16 will require four seconds, *f*/32 sixteen seconds, *f*/64 sixty-four seconds, and so on.

Now as to the approximate exposure. How long to give the plate is a question not easy to answer here, though if we were out in the field together it could be easily done. Light varies at different times of the year, being strongest in the four summer months. It is also more powerful in the middle of the day than in the morning or evening. In summer when the sun is shining you may reasonably give a landscape one second with aperture *f*/32 ; a seascape under similar conditions not more than half a second. Before nine and after four o'clock in summer the exposure should be doubled. Further assistance may be derived from the exposure tables given in the appendix.

The novice may also learn much from the following experiment :—Put the dark slide into the camera, but instead of pulling the slide-shutter out fully, draw it out only one-third of the length, and expose one second by taking the cap off or setting the slide-shutter for that length of time. When the cap is on again, draw out the shutter for another third of the space, and expose that portion for another second; then again for a final second, after pulling out the slide-shutter to its full extent. You now have a plate with portions exposed for three seconds, two seconds, and one second. This is then carefully developed, and when complete you can judge which is the portion most correctly exposed, and make a mental note as a guide for future work.

It is well to remember that blue is the most actinic colour, green next, and finally red, so that if a given subject consists chiefly of blue sky and blue sea a very short exposure only will be necessary. If, on the other hand, the subject is a green field with green trees on all sides, and not much sky, the exposure will require to be much longer than in the case of a seascape. Instruments called exposure meters can be obtained, and by the aid of one of these, and the tables that go with it, the beginner will be able to arrive more nearly at the right exposure than he would unaided. It is important, at first at all events, to enter in a notebook every exposure made. Exposure notebooks, ruled and supplied with columns, etc., may be had at photographic shops. But now let us turn once more to our illustration and discuss its merits.

MERITS OF THE PICTURE.—The illustration shows a picture that is anything but perfect from an artistic point of view. Its greatest fault is to be seen in the lines of the roadway, which lead the eye out of the picture instead of into it, and scatter the interest instead of drawing it together.

We may also observe that the picture looks flat, since it is without any direct sunlight to produce contrasts of light and shade. Not that sunlight is always necessary—indeed that is very far from the case—but in our present example, where there are very few objects, its presence would be an advantage, especially if the sun were on the left-hand side, to throw bold shadows across the somewhat dreary road, and so relieve its monotony. The position of the sun is an important consideration; if it were opposite the camera, between the tree and cottage, it would shine direct into the lens, and probably fog and ruin the plate at the time of exposure. On this account direct sunlight when present should come either from one side or another, as well as for the sake of the cross shadows. For this and other reasons also early morning or late afternoon are better times for taking photographs than in the middle of the day, when the sun is directly overhead.

We may next examine another photograph, where the principal lines do run towards the middle of the picture, and the improvement effected by sunlight is apparent in the long shadows that cross the street and act as a relief to its bareness (fig. 25, see opposite page 32). Observe also how useful a part the tree plays in filling up the sky and, by its dark foliage, giving perspective to the distance, as well as preventing the stonework of the wall from showing up too conspicuously.

From these illustrations we think the novice will already begin to realize that the simpler the subject the better the effect is likely to be. Indeed, that is a great truth in pictorial photography. Majestic scenery—the high precipice, the deep gorge, the grand panorama—are seldom brought down on to paper without ultimate disappointment. Though the painter may attempt greater things, it is in the little nooks and corners of nature that the photographer is safest—among copses and meadows, in winding lanes, by the river-side, or in the precincts of the village.

A VIEW-FINDER.—To assist the eye in

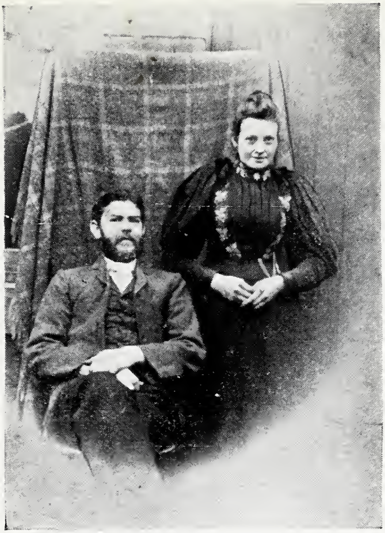


Fig. 33

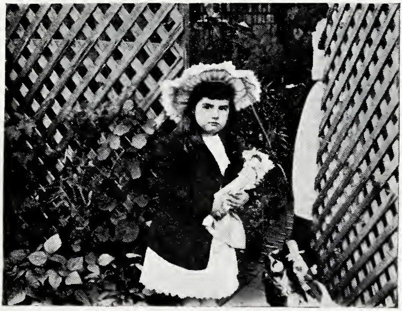


Fig. 34.

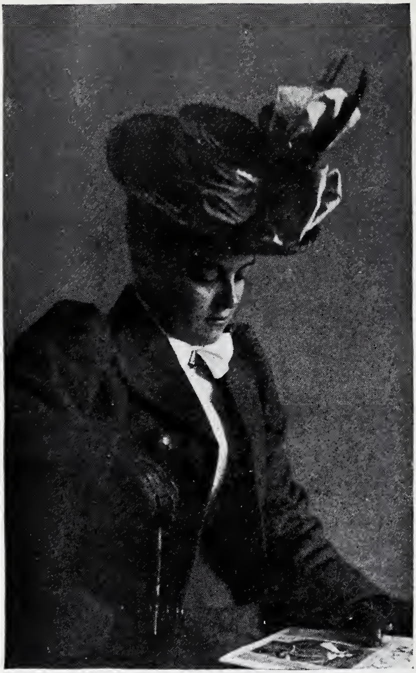


Fig. 36

Portrait taken in an Ordinary Room

selecting the most suitable scenes for photographing a simple view-finder will be uncommonly useful. Such a finder may be made from a piece of card or paper about six or eight inches square. In the centre of this card cut an oblong opening somewhat after the shape shown in fig. 26. Then, holding this slit in front of one eye, you can examine portions of the landscape without being confused by seeing the whole of it at one time, and, by moving the finder about to different points of view, pick out the best. If the slit is held close to the eye, a larger field will be included than when it is held at a distance of an inch or two. The reason for cutting an oblong opening, instead of one approximating more nearly to the relative

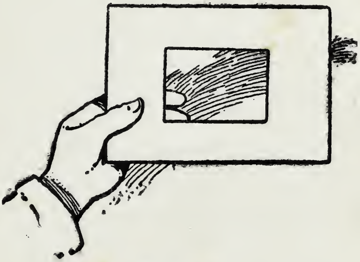


Fig. 26.

dimensions of the camera, is that the former shape is better suited for the majority of landscape subjects. The slit may be held upright or oblong according to the arrangement which best suits the view. And last, but not least in importance, is the injunction not to forget to trim the print ultimately obtained to the same narrower oblong, or upright shape if it appears to be improved by such treatment—and that is the case five times out of ten.

After a preliminary survey with the finder, then carefully consider the view as seen on the focussing screen of the camera, and do not make the exposure until you have found the very best point of view so far as your judgment goes. Sometimes by shifting the camera only a few feet, the lines of the picture are found to fall much more gracefully, or the objects in the foreground to be more suitably situated; and it is in this continual effort to search for the choicest position that the student cultivates his sense of the pictorial. Theory is all very well as a guide, but nothing save steady practice and experience brings ability.

THE PHOTOGRAPHY OF A COTTAGE.—Now let us turn to another picture, rather more elaborate in its composition, but nevertheless typical of the photographer's regular work, and see what sort of a lesson we can learn from it. We will give the genesis of its production, to enable the photographer to understand how the best point of view is only to be had by patient searching and is rarely found immediately.

We were desirous of photographing the particular cottage seen in the picture now under consideration. But it was most unfortunately situated (from a photographer's standpoint) in respect of a narrow lane on two sides, running between high walls. After two or three attempts and as many failures, we obtained the view shown in fig. 27 (following page 32). But even that, although decidedly better than the others, did not satisfy us, for the wall, irregularly constructed, made a severe base line, whilst a signpost plus an apartments ditto, and a fall-pipe across the house-side introduced so many disfiguring details that the rustic beauty of the whole was materially reduced. Moreover, from this position it was impossible to give any adequate idea of the surrounding country.

Therefore we went further away, and found ourselves in the middle of a five-acre field without a single stick or stone to relieve the monotony, or to break up the lines of the wall which ran right across the foreground and seemed to cut the picture in two. The case appeared almost hopeless—when we caught sight of a fence and an overhanging pollard ash, so moving to a still more distant position, we found that the elements arranged themselves much more harmoniously—the wall became an insignificant detail, whilst the house itself gathered much pictorial advantage from the more remote point of view, since it appeared in a superior "setting" (fig. 28, following page 32).

And so, whether we are prepared to go "all the way," as they term it, and look upon the camera as an instrument for rivalling the painter, or stand firm at some intermediate position, we cannot but admit that mere selecting of point of view can accomplish great things; can enable one man to produce far more pleasing prints than another; and, since selection itself is an art of no mean order, then photography in like degree becomes a pictorial art.

From each of the succeeding illustrations we may also derive useful instruction.

WOODLAND PHOTOGRAPHY.—Fig. 29 (see opposite page 33) is an instance of faults very often committed in photographing woodland scenery. Let us single out the technical mistakes first. Notice the great white flare in the sky, making the trunks and branches quite feeble where they project into it. This effect is caused by halation, and we must digress for a moment to explain what halation is. Whenever there are strong contrasts of light and shade, a certain irradiation or encroachment of light upon the darker objects will be observed, as in the case of windows of a room, trees against the sky, etc. This appearance has a corresponding effect upon the plate in photographing, which becomes still further intensified by reflection from the back of the plate. There are methods of remedying this defect by painting the back of the plate with some dark-coloured substance, such as caramel. Preparations for the purpose may be obtained from all dealers. But the photographer should in any event avoid taking trees with a strong light behind them, the effect is sure to be spotty where the light penetrates between the leaves, even if no great space of sky is visible, and the disfigurements of halation do not make their appearance. Furthermore, the negative from which our illustration is made has been over-developed, and in consequence the high-lights are so dense that they print in a pale chalky fashion, whilst the dark parts of the picture are relatively too dark. This state of affairs in a photograph has given rise to the expression "soot and whitewash," a qualification which it should be the aim of every photographer to avoid. As a pictorial composition this picture is an entire failure. The three trees in the foreground, all about the same size and shape, and equidistant from the spectator, break up the composition into three equal parts so formally as to destroy all harmony. Moreover, the photograph seems to be out of focus.

Now having seen what is bad let us turn to an illustration of a similar subject which it will be well for us to try and imitate (fig. 30, see opposite page 48). Here there is a total absence of violent contrast—the shadows are transparent, showing a fair amount of detail, the high-lights not in the least chalky, and a fine gradation of half-tone in between these extremes. No excess of sunlight makes itself felt, yet there are nice shadows, giving a pleasing relief to the different objects. One bold tree in the foreground, a winding roadway, disappearing in graceful curves, these with other harmonious elements make up a delightful whole, and give us a capital picture.

But exigencies of space compel us to bring these notes on ordinary landscape photography to an end, though we have only touched the fringe of the subject. We hope, however, that with the instructions we have given and the student's own judgment and sense of fitness, he will very soon be able to take a passable landscape photograph.

FIGURES IN LANDSCAPE. — But now we come to the question of figures in landscape. The artist tells us that figures may be brought into a landscape for a variety of purposes: to break up a mass or line antagonistic to the general effect, to direct attention to a particular place, to give additional interest to some special feature, and so forth.

The prevailing idea with photographers, however, is to supply the human interest; they like to see somebody about, otherwise the place looks deserted. Acting upon this notion it is customary, among novices at all events, to adopt one of the two following methods. If you have one friend with you, place him in a prominent position, in an unusual attitude (one that he rarely or never assumes in ordinary life) in the act of doing nothing, and doing it very consciously, and last, but not least, be quite sure he looks straight at the camera, or failing that let him fix his eyes upon space, because that performance is pretty sure to impart an insane expression to his countenance.

But if there are several friends, then sprinkle them about like currants in a cake, as near equidistant as possible; let them all pose as in the above case, and lastly, each person must gaze in a different direction, whilst if the eyes of one or two can be twisted sideways—their heads one way, their eyes another—the composition will have a harmony and completeness past all description!

Fig. 31 (see opposite page 49) shows the injudicious inclusion of figures. The photographer has discovered a pretty streamlet, crossed by a narrow "pack-horse" bridge. He scarcely takes in sufficient of the surroundings, but that question is a little outside our present topic. To this secluded nook he has not only introduced two ladies with costumes quite out of keeping with the scene but, furthermore, he has placed them in such attitudes that they seem isolated objects, and out of harmony with grey rock and grassy bank. Worst of all, their eyes are directed towards the camera, and not in the direction of any particular feature in the landscape.

Now, picture to yourselves the change which could be wrought if, in place of these *demoiselles*, a rustic youth were standing on the right-hand bank holding a rude fishing rod towards the dark pool under the bridge. The rod and his attitude would both aid in leading the eye between the bridge to the shallows beyond, and by that simple expedient the elements of the picture would be pulled together into a harmonious whole.

In photographing figures in landscapes, then, every precaution must be taken to so place them that they are subordinate and appropriate to the landscape. For example, if a roadway appears in the composition, then you may introduce to advantage an old man or woman, a carter leading a horse, or two or three children. Whichever of these suggestions may be adopted, it will often be advisable to let the people be retreating in the distance, or if approaching, so far away, or so much in the shade that only their outlines are visible.

As a simple illustration of the judicious use of figures in landscape, let us call attention to fig. 32 (see opposite page 49). The man and boy are appropriate to the scene—they are occupied with their own business and not with the photographer's operations.

PORTRAITS OUT OF DOORS.— We hasten on, then, to deal with the photography of portraits and groups. As remarked in the early part of this chapter, the first object a beginner in photography usually fixes upon is a human being. Scenery seems to him very vague at first; his mind turns instinctively to something more definite, and especially to a living person. So he perpetrates one or more of those familiar, but absurdly inartistic, productions which may be entitled "common or backyard likenesses." Of that species we have in fig. 33 (see opposite page 64) an excellent illustration, probably the work of an absolute novice. Let us criticise it. To hang a rug or a shawl over a clothes-horse is quite permissible and even desirable, so that the brickwork of the house or wall may be covered. But to merely substitute for the square stones, a pronounced square check pattern, is making matters worse rather than better. Why the photographer could not have brought forth a blanket for the occasion, and extended it far enough to fill the whole background, is difficult to understand. To crown all, he has attempted to vignette the print off at its edges, doing it like everything else, very badly—too much on the one side and not at all on the other. As to the posing of the figures, that is not so conspicuously bad as the rest of the performance, but faulty enough notwithstanding. Why should both sitters clasp their hands in front of them, and would it not be better if Mr. —— sat in a higher chair?

Very satisfactory portraits may be taken in the open air, if the photographer will only pay reasonable attention to the claims of æsthetic propriety, and not commit such absurdities as those just illustrated.

Observe that portraits are best taken in the shade—and not in direct sunlight. Avoid as far as you can too much top light, because that accentuates the cavity of the eyes and imparts a frowning expression. Sometimes a good place can be found where the branches of a tree modify the top light, or it is occasionally possible to make use of a piece of tent cloth, a blanket or a shawl for the same object. The open door of a shed or barn often makes a capital place for taking portraits without a background, if no light comes from within.

We have now to show a bad example of child portraiture, once again illustrating how the thing is *not* to be done (fig. 34, see opposite page 64). Here the surroundings are most distracting — the camera is too much above the child, and worst of all is the inclusion of someone else's figure partially concealed—an absolutely inexcusable fault. In the next place, it is bad form to cut off the feet in a portrait of this nature, because the ground beyond is visible, while the child's perambulator is also divided. Now, of all the backgrounds for portraits trellis is probably the least suitable, on account of the glaring patchwork effect it produces. The best use of trellis divisions is to nail a blanket or plain cloth background against, to employ for portraits proper—head and shoulders only.

PORTRAITS INDOORS. — As for portraiture indoors, that is not quite such a simple business as the open-air portrait, the main difficulty being to find a place where the light does not come from one direction only, so casting a very heavy shadow on one side of the face, whilst the other is strongly illuminated.

The average room has a window or windows on one side only. That being so, the best positions to put the sitter and camera are as shown in fig. 35. A is the background, B a reflector made by hanging a white sheet over a clothes-horse. The latter is employed to equalize the light on the face. If a blanket or rug is hung behind as a background it should be sufficiently far from the sitter to be out of focus. It is often a good plan to cover the lower panes of the window with tissue paper if the direct light is very strong. Accessories, save of the simplest and most natural kind, are to be avoided; a book, a writing table or a chair being the safest objects to make use of.

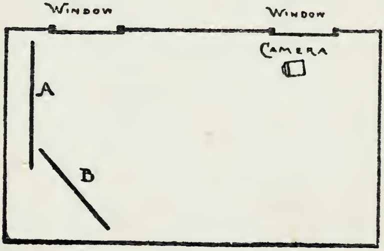


Fig. 35.

Referring again to the diagram, the camera is placed where shown, and should be not less than two and a half or three yards from the sitter with a lens of sufficient length of focus to admit of that distance. Short-focus lenses exaggerate the perspective to such an extent that in portraiture their effect is often very bad — the hands and knees of the sitter being enlarged at the expense of the head, which appears ridiculously small. On a half-plate camera a lens of at least 8 inches ought to be employed, and one of 14 inches would by no means be too long. The drawback to these long-focus lenses is, of course, their comparative slowness. But most people can sit perfectly still for eight or ten seconds, and it will be rare that a longer exposure is required. (See fig. 36, opposite page 65).

GROUPS. — In groups strange productions are often perpetrated by amateur photographers. Good excuses can be made for them, since at the best a group of friends, or a tennis club group or anything of that kind gives little or no opportunity for an effective arrangement. All one can do is to place them in two or three rows, the front row sitting, the back row standing. But one thing must not be overlooked— the individuals composing the group should be kept from gazing straight at the camera. Of course, groups of more than two or three cannot well be taken indoors on account of the inequality of the light.

Copying Illustrations, etc.—The novice rarely realizes that he can, without any special apparatus, make photographic copies of any illustration that takes his fancy, or diagram or plan required for any particular purpose. All he has to do is to fasten the picture or plan against the wall, or upon a door, at the exact height of the camera, and taking a string or a stair-rod or something of that kind, ascertain that the centre of the engraving is in a horizontal line with the lens and exactly at right angles to it. Care must be taken that no shadow falls upon the picture to be copied, and that it is evenly illuminated.

Pictures may be copied any size, and even enlarged. With a wide-angle lens, by approaching the camera very near to the picture, a portion of it can be selected, and photographed much larger than the original.

CHAPTER IV.

NEGATIVE MAKING.

DEVELOPMENT.—When the dry plate has been exposed in the camera, the image, of course, is invisible or latent, as the term goes. In order to bring it out, the process of development or reducing the silver salts has to be carried through. Development is a very fascinating operation. It is a delightful experience, especially to the novice, to see the image of some familiar scene gradually appearing on the plate. But this is anticipating, and each detail in the procedure must be carefully described, so that the chances of failure on the part of the student may be reduced to a minimum.

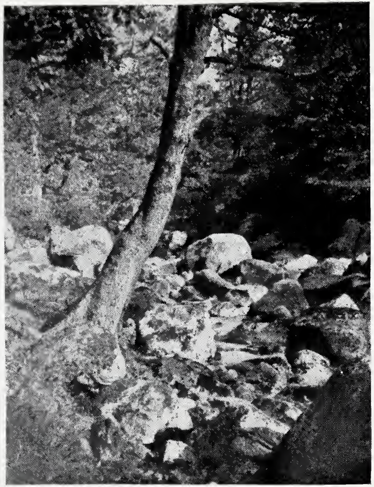


Fig. 39. Before Reduction.

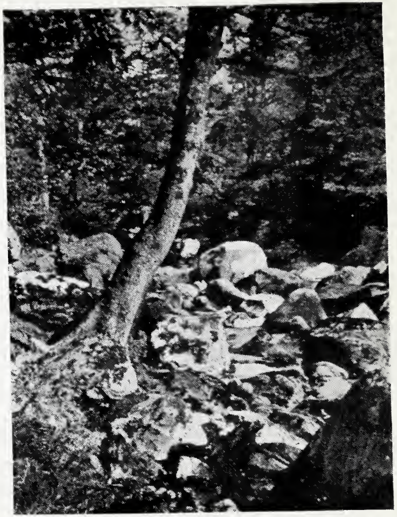


Fig. 40. After Reduction.

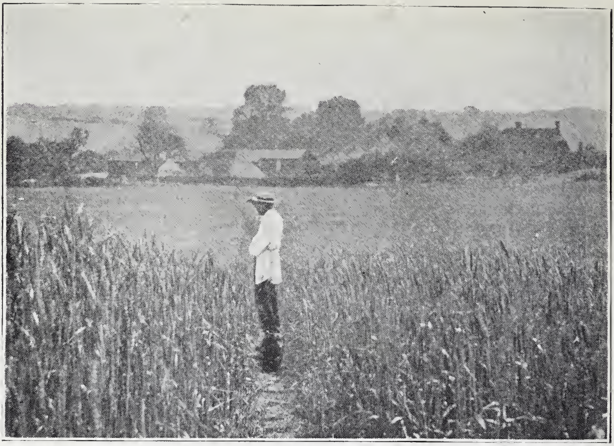


Fig. 37. Before Intensification.

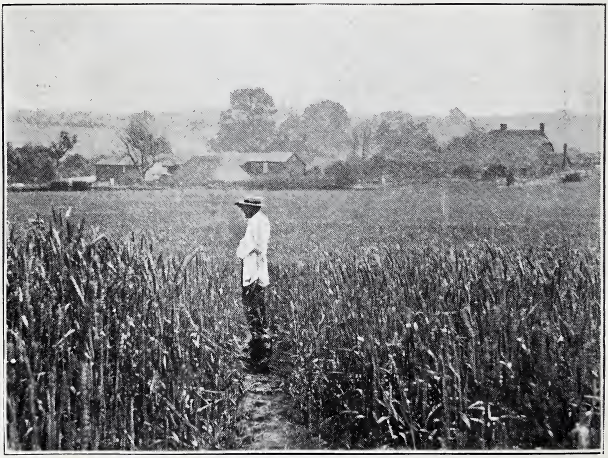


Fig. 38. After Intensification.

The first thing to do is to prepare the necessary solutions, so that when the actual process of development is commenced there may be no hitches in the proceedings. There are a great many reducing agents or developers, some possessing one trifling advantage, some another. We do not propose to bother the novice with many formulæ for developers. If he is of an experimenting turn of mind he may try others for himself, and then select that one for regular use which appears to him to work the best. The following, then, is the first of the two developers we recommend for regular work:—

No. 1.—The Pyro and Soda Developer.

Solution A.

Water	5½ ozs.
Potassium metabisulphite	70 grs.
Pyrogallic acid	1 oz.

Solution B.

Sodium carbonate, crystals (not bicarbonate) avoirdupois	2 ozs.
Sodium sulphite	2 ,,
Potassium bromide	20 grs.
Water to make up to	20 ozs.

Both these solutions, if stored in stoppered bottles, will keep good for several months, but it the quantities are considered too great, the photographer may weigh or measure out half the amount in each case. For use take in the proportions of 1 dram of Solution A, to which add 2 ozs. of water and 2 ozs. of Solution B. Sufficient developer should always be mixed to thoroughly cover the plate, enough indeed to prevent any portion of it becoming uncovered if the developing tray should be placed upon a table which happens to be not precisely level. In any event it is false economy to be stingy with developer.

Let us suppose, then, that we have entered the dark-room and closed up every source of white light, so that we are working by either canary or ruby light only.

In the first place a word or two about adapting the developer to the exposure. If it is believed the plate has been over-exposed, use a trifle more of Solution A than Solution B; in fact it is not at all a bad plan, if there is any doubt as to the exposure, to mix in the proportion of three parts A to one part B, and add more of B whilst development is going on, if required. If under-exposure is the case more water may be added to prevent as far as possible a hard negative, and then, of course, development will take rather longer.

Take the plate to be developed out of the dark slide, and do not omit to close the slide again. Dust the plate with a broad camel-hair brush. Take an ebonite or papier-maché tray for the developer. Lay the plate film side upwards in the tray; do not wash it prior to development. Pour on the developer gently so as to avoid bubbles, but quickly to prevent markings caused by uneven development. If you see any bubbles remove them by the tip of a camel-hair brush or with the end of the finger, but do not touch the surface of the plate with the finger nails. Rock the dish continuously, so that all parts of the plate receive an equal share of the solution's strength. It will not be amiss to cover up the dish with a piece of card whilst development is going on, excepting just at the moments when examining the plate, for although you are working by a non-actinic light, there is just a chance, if development should be prolonged, that it may slightly affect the plate. But if you are not quite close to the lamp, say a couple of feet away, this precaution is hardly necessary with ordinary plates. When you want to see how things are going on, there is no danger whatever in bringing the dish close to the lamp for a few moments, but you will be well advised not to do this more than is absolutely necessary. If properly exposed the image should begin to appear in from half a minute to a minute's time, and ought to take from 2½ to 5 minutes to become fully developed. Remember that the black parts represent what will be white in the print when you get to that stage.

The important question now is when to stop development. This point is not particularly easy to explain in words, and only experience will make the student absolutely certain. As a guide we may say that when the high-lights of the negative—that is those portions which are black—seem to be pretty strong and distinct, lift the plate out of the dish and examine the under side of it, looking at it and not through it. If the broad outlines of the darkest parts are fairly well visible, then development has been carried sufficiently far, and after rinsing in water the negative may be removed to the fixing bath.

THE FIXING BATH.—This consists of hypo 5 ozs., water 20 ozs. While the negative is in fixing bath it must be occasionally rocked. When all the milky-looking portion of the film has been removed by the hypo bath and the whole plate has turned black, fixing is complete. To judge this with accuracy take the plate out, turn it over and examine the back by reflected light, that is to say, by letting the light fall direct on the plate, and not through it. If there is absolutely no milky-looking deposit still left, then fixation is completed. The negative is then placed in water and thoroughly washed. If in running water half an hour will be enough; but if running water is not available, then an hour's soaking in a dozen or more changes of water should be given. Finally, the plate must be leaned up to drain and dry, for which purpose a draining rack is a useful appliance. It is inadvisable to increase the rapidity of drying by the application of heat, though under certain restrictions this can be done with safety. The novice, however, should patiently wait until the negatives dry by themselves, being content with removing them, as soon as the superfluous moisture has drained off, to a warm room, where drying will proceed more quickly. Avoid dust. On no account must they be used for printing until they are thoroughly dry.

PRECAUTIONS IN DEVELOPMENT.—Throughout development, fixation and washing the following precautions must be well observed. Avoid touching the film side of the plate with the fingers, especially the nails. Dozens of negatives are spoilt in this way by careless photographers. The same developer will develop three or even four plates successively and it should then be thrown away, as with frequent use it becomes discoloured and will stain the plates so intense a brown as to retard the subsequent printing process. Do not, however, pour developer which may have been used only once or twice back again into the bottle, but throw it away if you have no more plates ready for immediate development. Do not expose the negative to white light until it is in the hypo solution. As soon as it has been in the fixing solution a minute or two it will be perfectly safe to turn on the white light.

The temperature of the developer is an important consideration. In cold weather, when water comes through the tap almost at freezing point, the solutions that you prepare will be so cold as to considerably retard development. On the other hand, in summer there are other possibilities to guard against. If the developer, through having been kept in a warm room, is, as compared with the water in the tap, relatively hot, then when the negative is subsequently rinsed in cold water and forthwith placed in a fixing bath which may be many degrees warmer, the rapid contraction and expansion of the gelatine film, through its immersion in these solutions at different temperatures, causes it to curl up a little at the edges and begin to leave the glass support. The remedy is to keep the solutions as far as possible at fairly equal temperatures, or in particularly hot weather to omit the intermediate rinsing and to place the negative direct into the hypo. Or, on the other hand, the hypo may be kept in a cool place. In winter the best thing to do is to have a little hot water handy, and before commencing development fill the developing dish, allowing it to stand for a moment or two, and then pouring away. This warms the dish, which will transfer its heat to the developer when poured in, and so the action is induced to proceed more quickly and efficaciously than when the solutions are icy cold.

Negatives which have been insufficiently washed soon show hypo crystals on the surface when they are dry, and whenever these make their appearance the negative should at once be immersed in water, and washing prolonged until all traces of hypo are likely to have been removed.

Metol and Hydrokinone Developer.—The second developer with which we propose to deal is one in which the essential ingredients are metol and hydrokinone.

No. 1.

Metol	40 grs.
Hydrokinone	50 ,,
Sulphite of soda ...	120 ,,
Bromide of potassium	15 ,,
Water (boiled or distilled) to	20 ozs.

No. 2.

Caustic potash......	180 grs.
Water (boiled or distilled) to	20 ozs.

In using this developer the image will appear perhaps a little sooner than with pyro and soda, and the finished stage will be reached in from two to three minutes. The procedure is exactly the same as in the previous case. For use, take equal parts of No. 1 and No. 2. If under-exposure is suspected, then use rather more of No. 2; if over-exposure, rather more of No. 1.

The main advantage of this developer is that it does not stain the negative so much as pyro and soda, therefore it may be adopted in preference for the development of snap-shots, for which prolonged treatment is often essential.

Errors in Development.—However careful one may be, little miscalculations will occur in development, especially if the previous exposures have not been judiciously managed. Our next duty, therefore, will be to explain how best to avoid errors in development. If, when you have placed the plate in the tray and have poured on the developer, the image flashes up almost immediately, and the whole negative turns rapidly black, it is then said to be fogged, and the causes of fog are as follows:—(1) Over-exposure, in which case the novice will be well advised to expose a fresh plate on the subject, taking care to abbreviate the length of time. (2) White light entering the camera or the developing room. Examine the camera carefully (as described in Chapter I.), also make a survey of the dark-room, stopping up small chinks, which, though not important individually, may in the aggregate produce an effect upon the plates both at the time of putting them into the slide and during development.

The effect of slight over-exposure may be modified to some extent by the immediate addition to the developer of several drops of a 10% solution of potassium bromide. This 10% solution is made by dissolving 46 grains of bromide in a fluid ounce of water, or proportionately if a larger quantity is prepared. The photographer should always keep such a solution by him in a small stoppered bottle, or one of the dropping kind mentioned in a previous chapter. However, if over-exposure is at all serious, we strongly advise the entire novice to throw the plate away and try again. He should thoroughly practise until he has acquired the knack, under ordinary circumstances, of adapting exposure to development, since doctored negatives are always more or less unsatisfactory. Prolonged development will also produce fog, especially when very rapid plates are used, and the dish is incautiously held too near the source of light. Thin, weak negatives with clear shadows are caused by under-development. To avoid this be certain to examine the back of the plate, and make quite sure that the conspicuous portions of the image are pretty clearly visible. Judgment can only be formed of the condition of the image by holding it up to the source of light for a moment and looking through it. If development has been carried far enough, the image will appear vigorous and the high-lights dense. Negatives which appear very strong in the high-lights, but have the shadows devoid of any detail, are under-exposed, and the best thing to do is at once to throw them away and take the subject over again, giving a longer exposure. If the negative appears weak, and yet has plenty of detail in the shadows, it is due to over-exposure, and perhaps also to the developer being too weak. If the negative is over-dense, it is due to over-development or a developer of too great strength. When round white spots appear during development, they are usually due to air bubbles adhering to the film. To avoid them rock the plate frequently, especially just at first when the solution is poured on. If these bubbles are ignored they form round, transparent spots in the negative, which, of course, print black, and are particularly unsightly and difficult to get rid of if they should appear, as they usually do, in the middle of a person's face or in a clear sky, as though they were newly-discovered planets.

Sometimes, but not often, the spots are not attributable to air bubbles, but to little insensitive places in the film. For these there is no remedy. Dust is also the cause of transparent spots of irregular shape, and too much care cannot be exercised in the wiping-out of the camera and the slides from time to time with a damp cloth.

So much, then, for the actual making of negatives. The absolute novice, as we have already hinted, will be well advised to take his negatives as he finds them. If they are dense, well that means a longer time to print; if thin, then he must be satisfied with the best print possible, or throw the negative away. However, after a few weeks or months at photography he may venture to attempt various subsequent processes of improvement upon defective negatives; and he will soon realize that there are very few negatives really incapable of amelioration in either one way or another, and also that it is no great task to redeem a considerable proportion of those negatives which, in the light of limited experience, had previously been consigned to the dust bin.

INTENSIFICATION.—The first of these reforming operations that can be advantageously undertaken is intensification; and though, of course, there is a limit to what can be done in this direction—for no operation will raise a perfectly ghost-like negative to efficient printing density—yet a very considerable amount of strengthening may be accomplished. Let us suppose we have a thin negative, the unfortunate result of over-exposure and inexperienced treatment in developing. With the usual method of printing it yields such a flat and contrastless print that you do not deem it worthy of a place in your album. Take a strong—an almost saturated—solution of bichloride of mercury, pour into a measuring-glass about an ounce, and add three or four times the volume of water. This quantity will be sufficient to cover a half-plate negative. If you are working quarter-plate, then a smaller quantity will answer the purpose. Now place the negative in a porcelain dish, and pour the mercuric solution over it, rocking steadily to ensure every part being well covered. In a minute or two the image begins to turn white, and in the course of five or ten minutes it is entirely "bleached," as the expression goes, so that the negative looks almost as white as the dish itself. When you hold it up to the light, however, and look through it, you will see that the image is still there, though in rather a ghost-like condition. The next operation is to remove all traces of the mercury solution by thorough washing for not less than a quarter of an hour in running water. It is not a bad plan to place the negative on the top of a measuring-glass, and let a thin stream of water from the tap run gently on to it. In the meantime prepare a dilute solution of ammonia—about 1 drachm of the strong ammonia (·880) to every 2 ounces of water. When the washing of the negative is complete, place it in any dish and pour on the ammonia, rocking at the same time. The image begins to appear at once, browner and stronger than before. In three or four minutes it will have reached full density, and if you now hold it up to the light you will see that its condition is now very different from its feeble state at starting. Wash thoroughly once more, put up to dry; when ready, a new print can be made which you will find is considerably better than anything that could be obtained from it previously. Illustrations showing (fig. 37) a print from a negative before intensification and (fig. 38) a print from the same negative after intensification will be found opposite page 81. Bichloride of mercury is exceedingly poisonous, and should be so labelled and kept on an upper shelf out of the reach of young people. Ready-made intensifiers, which do the work in one operation, may be obtained from most dealers. These are handy for those photographers who have not good conveniences in the way of a laboratory and a supply of running water for washing. Other suggestions in regard to getting the best results from weak negatives will be found in Chapter V.

REDUCTION.—Just as the photographer is liable to make his negatives too thin, so, on the other hand, by extreme cautiousness in avoiding this fault, he may make them too dense; but reduction, the opposite of intensification, is an operation less frequently required in the case of negatives, since it is almost always possible to make a good print from a very dense negative, though the printing operation may take a long time, whilst if the negative be too dense in certain places, there are methods of combating this drawback in printing, which we shall describe later in the chapter devoted to that subject. With lantern-slide making reduction is much more often necessary. We shall deal with the process as applied to lantern slides, however, in Chapter VII.; we are concerned now with negatives only. Reduction may be either local or general. If the whole of the negative is dense through an error in judgment in developing, we can thin it down by immersion for a short time in a 5 per cent. solution of ammonium persulphate, further action being then stopped by placing for a moment or two in dilute sodium sulphite—exact strength immaterial—and then washing thoroughly. Ammonium persulphate is particularly adapted for the reduction of hard negatives, because it modifies the contrasts. If we wish to preserve the contrasts, a new reducer—peroxide of cerium—recently put upon the market has been highly recommended. The following is also a powerful method of reduction:—Place the negative in water, and after soaking remove it to a dish containing hypo solution of ordinary strength as used for the fixing, to which a few drops of a saturated solution of potassium ferricyanide have been added. Reduction will take place pretty rapidly, so you must be on your guard—in fact, when you have rocked the plate in the hypo and cyanide solution for a few moments, take it out and hold it under the tap, or immerse in clean water, and then examine to see how far the reduction has proceeded. If still too dense repeat the operation. When the negative has been thinned down to proper density, wash thoroughly for about a quarter of an hour, preferably in running water.

We have so far described what is known as general reduction, but reduction may also be performed upon a negative locally; certain portions of it may be reduced, while others are left in their original state. This is very useful for improving negatives of scenes involving great contrasts—as, for example, deep glens whose near recesses are very feebly lighted, whilst their upper banks are bright in the glare of the sun. Let us take an example: Fig. 39 (see opposite page 80) shows a landscape, the rocky bed of a stream with leafy trees meeting each other overhead. You will observe that in this picture the stones in the stream are much too light. Gray in colour and fully illuminated by direct sunbeams as they were, it is only natural they should act upon the film more rapidly, so that in developing they became almost opaque before a fair amount of detail could be observed in the deep green canopy above. Now, what we want to do therefore is to reduce this dense foreground of boulders and pebbles without interfering with the trees. In fig. 40 (see opposite page 80) the work has been done, and you will see how much better and truer to nature the effect is. The exact procedure was as follows:—The negative was immersed in ordinary hypo solution diluted to about half its strength, sufficient being put in a small dish to just cover the negative. After allowing it a brief interval to get thoroughly soaked, we take a saturated solution of potassium ferricyanide and pour into a watch-glass or an egg-cup or any small open vessel about half a teaspoonful. The next thing we want is a wad of cotton wool, which is first moistened with water, then dipped into the ferricyanide solution. Then we remove the negative out of the hypo solution and hold it with the left hand; with the right we dip the ferricyanide wad into the hypo dish, so as to bring about a mixing of the two solutions in the wad, and then rub it gently but rapidly over the dense portion of the negative with a circular sort of motion. Reduction, of course, takes place very quickly, and in a second or two we must make haste to hold it under the tap before matters go too far. It is not at all unlike sponging pencil-marks off a slate. To modify the speed of the reducer the ferricyanide solution also may be slightly diluted. Once you get used to the speed of the action you will manage the operation all right, but before working on anything valuable be sure and practise a bit on one or two waste negatives. It is essential to work in a good light, so as to see the slightest thinning of the film. To conclude the operation, again wash the negative well. These, then, are all the operations for the chemical improvement of negatives with which we need trouble the beginner.

The only other performance for the improvement of negatives which we shall now enter into is a mechanical one—the stopping-up of pinholes, or small blemishes of any kind that persist in making their appearance on some negatives, however careful we are in developing them. To do this take a brush and some Indian ink, with the addition of a drop or two of gum-arabic solution. Apply this with the point of a fine brush to the pinhole, making your colour strong enough or weak enough to correspond with that portion of the negative to which it has to be applied. If after the first application the result is found unsatisfactory when dry, moisten the finger and gently rub the colouring away, and apply afresh.

VARNISHING NEGATIVES.—To preserve negatives from damp and scratches, the wear and tear of printing, etc., they may be varnished. Negative varnish can be had ready made from every dealer; and though we give the recipe for making it among the miscellaneous items at the end of this book, we do not advise the novice to try to make his own varnish. Before applying it, warm the negative over a gas-jet to ensure that it is thoroughly dessicated; when almost cool again, pour on the varnish in the middle with a steady, even flow, holding the plate on the tips of the fingers, as shown in fig. 41. When it has flowed all over, expand the fingers, catching hold of the plate by its edges, so that the varnish may run back again into the bottle (fig. 42). When it has all drained off, hold the negative once more over a gas flame to make it dry thoroughly hard.

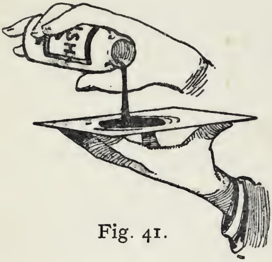


Fig. 41.

Retouching.—Retouching is almost beyond the novice, but he may possibly do a little in this way to advantage. Before any retouching can be put upon a negative it must be treated with a retouching medium, so as to give a tooth to the pencil. Retouching medium can also be purchased at the dealers, and it is usually applied with a tuft of cotton wool or the finger to the spot where the retouching has to be done. Then take a pencil of medium hardness and of good quality, as a gritty pencil would produce scratches. Retouching pencils can be bought especially for the purpose. The pencil should be sharpened to a fine point by rubbing it on very fine sand-paper, and the thin spots or scratches or blemishes may then be worked over with fine cross lines, or in that way which seems to give the best results. To perform this operation a retouching-desk is useful; but if the photographer does not possess one, he

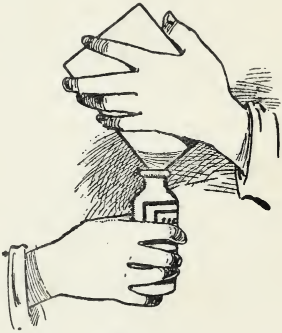


Fig. 42.

may simply hold the negative up against the window, so that the light falls through it. There are books which give a full account of the art of retouching, and to those the photographer must be referred if he requires further information upon this subject.

CHAPTER V.

PRINT-MAKING.

GENERAL OBSERVATIONS. — There are a great many printing processes, simple and complex, putting no small variety of effect within the capacity of the photographer. Some printing papers give an image in full detail, and only require toning and fixing; others do not exhibit the image in its full strength when taken from the printing frame, but must be subsequently developed and fixed. We propose to describe in this book only four printing processes, which are the simplest and most used. Their chief features may be tabulated as follows:—

Platinotype.—Prints by daylight. Image faintly seen after printing. Developed with potassium oxalate to full strength. Fixed in dilute hydrochloric acid. Washing takes five minutes. Total time required to make a finished print about half an hour.

Printing-Out Paper.—Image printed to full density. Prints washed and then toned. Then washed for two hours. Total time required to make a finished print about three hours.

Bromide Paper.—Printed by gaslight in a few seconds. Image absolutely invisible till developed with metol or hydrokinone. Washed for five minutes, then fixed in hyposulphite of soda, then washed for two hours. Time for completing a finished print about two and a half hours.

Carbon.—Printed by daylight. Image quite invisible. Printing judged by a strip of P.O.P. Transferred to final support. Developed in hot water. Washed for a minute or two in cold water. Total time required to obtain a finished print about forty minutes.

For printing pure and simple the only apparatus required is the printing frame (fig. 43). As these simple appliances are very cheap, costing only a few pence each, the amateur will be wise to go in for half a dozen at least, to enable him to print from six negatives at one time.

Now take the negative or negatives from which you wish to make prints. Examine each of them, and see that the glass side is clean; if not, rub with a cloth until perfectly free from markings. The film side should then be dusted very gently with a perfectly dry duster. The next proceeding is to open the printing frames, and to place each negative glass side downwards therein. The sensitive paper, whatever it may be, is then put upon the top of the negative with its sensitive side to the film side of the negative, and then above that a pad made of two or three pieces of paper or, better still, thin india-rubber cloth. Then the

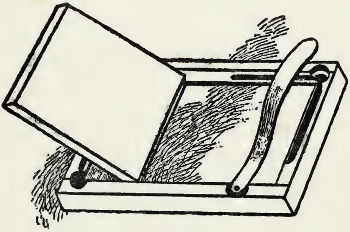


Fig. 43.

back of the frame is clamped into position by means of the springs. To obtain a good print, place the printing frame with the negative upwards in a light place, but not where any shadow is cast upon it. The roof of the house, if the photographer should be working in an attic, is an admirable place for printing, provided the sun is not shining. Failing that, the printing frames may be put up inside any window at such an angle that they face towards the sky. It is a good plan to tie a cord across the window a few inches from the bottom of the pane, and lean the printing frames against it. If the negative is a weak one, the best result will be obtained by letting it print slowly in weak light; if, on the other hand, it is a very strong one, it may be put in direct sunlight, but, as a rule, a place where there is strong diffused light is better. The length of time necessary for making a print varies very much with the density of the negative and the strength of the light. Sometimes ten minutes is sufficient, whilst in winter, when the light is weak and less actinic, a day or more may be needed. Further details in reference to this point will be found under each printing process described.

But a few more details as to the best methods of printing must be given before we pass along to the individual processes.

Thin negatives give better results when the frame is covered with thin tissue paper, though, of course, this prolongs considerably the time taken in printing. From time to time the progress of the print may be examined by lifting one side of the back of the frame and turning the sensitive paper back, taking every precaution in so doing not to meddle with the other spring, or a blurred and therefore spoilt print will be the result. Nor should it be examined in full light unless done rapidly, or the white portions will become more or less degraded. As each print is finished it should be placed in a box, and kept entirely away from the light, until you are ready for toning or development as the case may be.

Sometimes negatives are unequal in density. For example, the foreground may be rather thin, whilst the distance is dense. With care it is possible to equalize these contrasts by laying a piece of cloth or a duster on the printing frame and roughly covering the foreground portion, whilst the other parts are allowed to print more deeply. If printing is going on in a good light the cloth must be moved every minute or so, or there will be danger of producing a distinct line of demarcation. Or the same result may be arrived at by a different method of treatment. Upon a piece of tissue paper rub with a stump or crayon a groundwork corresponding with the portion of the negative you wish to retard. Put this in front of the printing frame, not quite close to the glass, and print in a diffused light.

PRINTING IN CLOUDS.—As a rule, when a negative is taken in the ordinary way it will be found upon developing to acquire so much density in the sky part that the clouds, even if there were any visible at the time when the photograph was taken, will not make their appearance in the ultimate print—the sky will remain perfectly white. The reason is that the sky, being so much more illuminated than the landscape, that portion acts far more quickly upon the plate, so that in reality the sky is vastly over-exposed when a proper exposure has been given to the landscape itself.

Now, to represent in a photograph either the deep ethereal blue of the sky, or the beautiful clouds that may have been there, by white paper, is a long way from the actual; for "bald-headed" landscapes, as they have been called, are primarily untrue to nature, and decidedly objectionable from an artistic point of view.

There are two ways of treating prints to overcome this difficulty; one is a process of double printing whereby clouds can be added, and the other is called "sunning down," which has the effect of producing something like the appearance of the deep blue sky. As double printing is not so easy for the novice, he will perhaps be wise at first to content himself with a slight sunning-down of his skies. How sunning-down is accomplished we must now explain.

SUNNING DOWN.—After the print has been exposed behind the negative until sufficiently deep, take it out and lay it upon a table near to the window with the foreground towards the window. Cover it partly up with a cloth, leaving the sky part exposed to the light. Every minute or so gradually move the cloth further up the sky, being careful to keep the rest of the print well covered whilst the operation is going on. You can thus produce a sort of graduated sky, lightest at the horizon and getting gradually darker towards the zenith. Be very cautious not to carry this operation too far, or you will get an unnaturally dark-coloured sky. This, then, is what is known as sunning down; and, as an expedient somewhat easier to perform than cloud printing, it may be specially recommended to the novice.

PRINTING IN CLOUDS.—We next come to the practice of printing in clouds. There are two or three ways in which this effect may be arrived at. The photographer may make for himself a series of negatives of clouds, giving very short exposures and leaving the landscape out of the question entirely, or, on the other hand, he can buy cloud negatives ready made from the dealer. Of course, whichever plan may be adopted, care must be exercised not to associate an evening sky with a landscape taken at mid-day, or any such anachronism; nor should one employ the same cloud negative more than once or twice, or one's prints will have a most undesirable similarity. The photographer ought not to be content until he possesses at any rate a dozen different cloud negatives suitable for a variety of landscapes.

Now we come to the practice of adding these clouds by the double-printing process.

If the horizon-line of the landscape is pretty straight, and the sky is not encroached upon by any conspicuous objects, such as the roof and chimneys of a house, a tree, or anything of that kind, it is not at all a difficult matter to print in the sky. What we must do is to first print the landscape from the negative in the ordinary way, and then selecting our cloud negative, print that into the white sky portion, whilst the landscape portion already impressed upon the paper is protected from light by means of a cloth or duster, much in the same manner as previously described. The cloth should always be nearest the source of light and arranged as shown in fig. 44. The duster should be slightly moved occasionally, so that there is no possibility of producing hard-and-fast lines, and little portions of it may be made to project in order to protect any objects that come close to the horizon line.

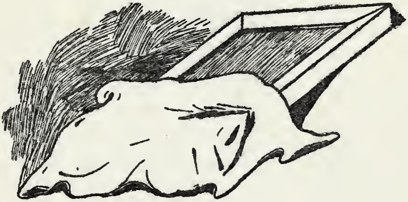


Fig. 44.

In order to use just that portion of the cloud negative required—for probably only a portion of it will be needed, according to the width of the white sky in the first-made print—it is advantageous to avail oneself of a larger size of printing frame which has been fitted with a sheet of thick glass. The cloud negative is placed upon this and the print above the cloud negative, fitting precisely as required. This arrangement will be better understood by reference to fig. 45. But if the horizon is very irregular the operation becomes a little more difficult, and we must then cut a mask to fit the foreground whilst the cloud is being printed.

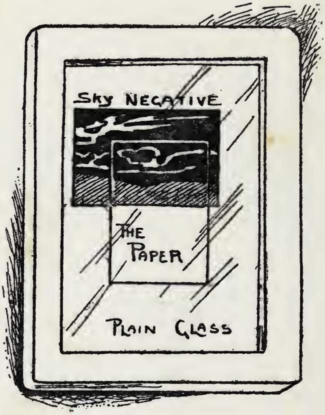


Fig. 45.

Fig. 46.

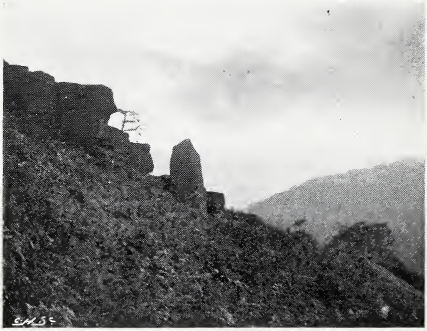


Fig. 47.

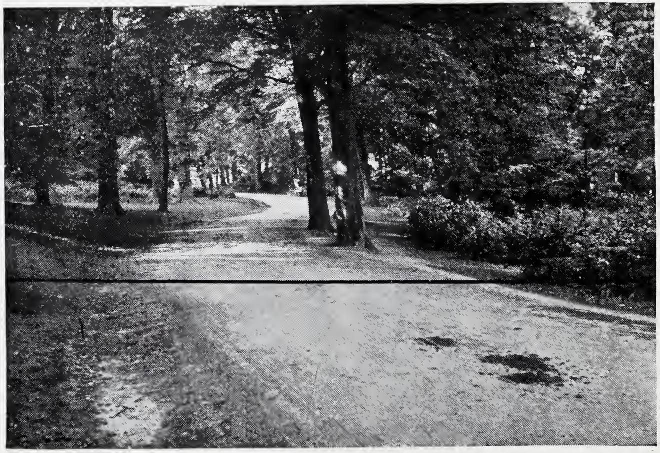


Fig. 50.

This mask should be cut out of black paper, which can be obtained at the dealer's; and the best way to do it is to make a rough print, which need not be toned or fixed, paste it on to the black paper, and then cut round the horizon with a pair of scissors.

Sometimes one can employ both the combination of the duster and the mask method, sometimes sawdust may be used to protect the landscape, and there are other little dodges which the photographer will gradually find out for himself as he becomes more experienced.

This description may be further elucidated by reference to the two illustrations (figs. 46 and 47 opposite page 112), one showing the cloud print and the other the landscape as well, and in this connection it may be well to point out that it is more convenient to print the cloud in before the landscape.

To give special shapes to prints, such as ovals, etc., masks may be obtained made of black paper, which are put in the printing frame, and so leave a certain amount of the margin white. These masks are sold in boxes at the photographic shops, and, as variety is always pleasing, we may recommend the amateur to occasionally employ them. Fancy masks in the shape of leaves and other objects are to be avoided, since by their fantastic appearance they draw attention away from the picture itself.

From the previous rough classification it will be seen that platinotype is the simplest and quickest process of printing; and as the novice is usually desperately impatient to see the finished result of his labours, we will describe the practical details of the platinotype process first.

THE PLATINOTYPE PROCESS.—The first consideration is the developer. Take 6 ounces of neutral oxalate of potash, and dissolve them in 25 ounces of hot water. This solution will keep any length of time in a stoppered bottle. Another solution is required also, the clearing solution. This consists of one part hydrochloric acid in sixty parts of water. The best acid should be used. These are all the solutions required for the platinum process, and it will therefore be seen at the outset how very simple the operations are.

The paper is sent out by the various makers in sealed tubes, and although they do not recommend that these tubes be used for storing the paper, we have kept ordinary cold-bath paper successfully in them for several months by placing them in a dry place and seeing that the calcium chloride —the substance wrapped in cotton wool, a piece of which is placed in every tube—is in good condition. The yellow side of the paper is the sensitive side, and if, in removing from the tin or handling in any way, any moisture whatever comes in contact with the yellow side, it will produce a blemish in the ultimate print. People with moist fingers should be extremely cautious in handling platinum paper, and should touch it only at the extreme edge with the tips of the fingers or the nails.

Now for the operation of printing. On a fairly light day this takes place very rapidly, and with a negative of proper density will be complete in fifteen minutes or even less. Behind the print in the printing frame place a sheet of india-rubber cloth to prevent the access of moisture, and if the weather is damp it is preferable not to put the printing frames into the open air, but to place them inside the room close to the window. When printing is complete the image is only faintly visible, but the photographer will soon arrive at a proper judgment in regard to this point, aided by a little pamphlet which is usually sent out with the tubes of paper. It is always best to develop immediately after printing, for two reasons—first, because the paper deteriorates by keeping when once outside the tube, and even if retained a few hours the print will lose much of its pluck thereby; and, secondly, because immediate development enables one to remedy any error in time of printing with the other frames in process of exposure, for, since the operation of printing is so rapid, the photographer will be wise when dealing with platinum paper to give his whole attention to the work during the time he has it in hand.

Well, the print being considered sufficiently exposed, prepare to develop it. Take three trays, preferably of porcelain. In the first pour sufficient potassium oxalate solution to nicely cover the print; in the second, a corresponding amount of the hydrochloric acid clearing solution; in the third, the same, for the prints must pass through two clearing baths in order to be sufficiently purged from stains. Take your print, place it face downward in the oxalate with a sort of left-to-right motion to force out the bubbles, and immediately turn it over. If any bubbles still adhere to the surface, remove them with the tip of the little finger, rock the tray, and in a few seconds printing will be complete. There is little or no control over the print during development. As it has been printed, so it must be allowed to develop. Therefore much of one's success depends upon hitting the precise density in printing. We find it a pretty safe way of determining density to carry on printing until the shadows begin to be slightly bronzed. Now lift the print out, allowing the superfluous oxalate solution to drain off, and then place it direct into the first clearing solution. Here it must remain about five minutes, and be turned over once or twice during the soaking. Then, allowing it to drain again, place it in the second clearing bath, where it must remain about the same length of time. Finally, place it in water, and after rinsing it in one or two changes the operation is complete. It may be allowed to dry, or be placed between blotting-paper to expedite drying.

You will see therefore at once how rapidly a platinum print may be completed, and what a great advantage it is to those amateurs who have no special arrangements in regard to a properly fitted laboratory with all its facilities, including a full supply of water, that so little washing is required—in fact, it is quite easy to print, fix, wash and complete a platinum print in half an hour.

One or two cautions. As platinum paper is very sensitive and prints so quickly, of course it is desirable to do the developing and clearing in a somewhat feeble light, and not in the broad glare of sunlight. If the operations are performed in an ordinary room, the photographer may do his development with his back to the window at the opposite side of the room. One lot of developer will do quite a number of prints, but as soon as it shows signs of slackness pour away and take a fresh supply; potassium oxalate is not expensive stuff. The same remarks also apply to the acid clearing bath. After being used for a little while, No. 1 bath should be thrown away and No. 2 bath brought into its place, while No. 1 is refilled and becomes No. 2. The temperature of the developer should be 60° Fahr. or a little above it—that is to say, about the temperature of an ordinary dwelling-room. To obtain this in winter, before commencing operations fill the developing dish with hot water, and when you are ready pour this out and pour in the developer. Platinum paper can be obtained in two or three qualities—smooth, rough, etc.—and either in cut sizes or large sheets. Artists prefer prints on this paper to almost any other, excepting perhaps carbon, because of the various effects possible by printing lightly or deeply and the pleasing, etching-like effect of the finished print. In exhibitions one sees far more of this paper than of any other.

So much, then, for the plain, straightforward process of platinum printing and developing. There is, however, one modification of the ordinary method which it is well for every photographer to know—that is, that brownish prints may be obtained instead of the usual black ones by adding to the developer a few drops of a saturated solution of mercuric chloride; about ten drops is usually sufficient for an ounce of developer, but more may be added if the effect does not seem sufficiently pronounced. If, furthermore, the developer is warmed by placing the dish containing it into a larger dish into which hot water is frequently poured, stronger prints and a still more intense colour will be produced. It does not matter much how warm the developer is, the prints take no harm, but as this heating increases the vigour of the developer, it is as well not to carry printing quite so far in the first instance. I can also recommend a warm developer for paper which has deteriorated slightly with keeping.

And now, in conclusion, there is one precaution which the platinum-paper printer must carefully exercise—and that is, that during his operations prior to development no moisture of any kind comes in contact with the print. If the printing frames are put outside the window on a damp day, the effect is sure to be noticeable in the flatness of the prints when finished, and on no account should prints be left in the frames overnight for the same reason. Some workers take the precaution of warming the printing-frame pads before using. The platinum-paper process just described is known as the "cold-bath process." There is also another kind of platinum paper which must be developed with the solution at a temperature of about 160° Fahr., yielding fine sepia-coloured prints. We can scarcely include this in a handbook for novices, though there is really nothing complicated about it. But the reader may find full details of the process in any of the special text-books dealing with platinum printing.

Gelatino-Chloride Paper.—This paper is sold in cut sizes by all dealers. It is familiarly known as P.O.P. The whole procedure is as follows :—Put a piece of sensitized paper behind the negative in the printing frame. Be sure that the printing frame has a pad either of paper or cloth between the back and the print, and that the springs fit fairly tightly, so that every part of the sensitive paper shall be in contact with the negative. Place at a window to print, not in the sunlight and not where the shadow of the cross-bar or the window frame will interrupt the direct passage of the light. The print should be done in from ten minutes to an hour or more, according to the density of the negative and the actinic power of light on the day in question. Print rather deeper than the print is ultimately desired to appear, as it will "go off" a little in toning and fixing. When by the procedure described sufficient prints have been accumulated to make it worth while toning (it is hardly worth beginning for less than six), prepare for toning as follows :—Take a 15-grain tube of gold chloride, and place it in a small stoppered bottle which you have previously gauged to hold not less than 15 drams of water. Shake the bottle till the glass tube breaks, or break it inside the bottle with a glass stirring-rod. Then pour in exactly 15 drs. of water, and you will have a solution of gold chloride containing one grain to each dram of water. This method is much better than attempting to weigh out a small quantity of the crystallized gold chloride. When the gold chloride solution is ready, measure into a perfectly clean glass-stoppered bottle 16 ounces of water, and add to it 30 grains ammonium sulphocyanide and 2½ grains of chloride of gold, i.e., 2½ drams of the solution of gold chloride. Shake well, and the toning solution is ready for use. Be very certain that all measures, bottles, etc., used for mixing the toning bath are absolutely clean, or stained prints may be the result. Ready-made toning baths are to be had from the chemist, if the photographer desires to save himself the trouble of preparing them himself.

Now for the process of toning. First wash the prints thoroughly through two or three changes of water in order to remove the surplus silver, allowing them to soak two or three minutes in each. Have dishes ready in a row in the following order:—1, toning; 2, water; 3, fixing; 4, water. Half fill the first dish with the toning solution to cover the prints well. If a very large number of prints have to be treated, take not more than a dozen at one time. Put them singly into the solution, making sure that each is thoroughly wetted. When all are in, turn them over separately, beginning with the bottom one. Repeat this until they are of the desired tone, about five or six minutes will probably be required, and then put them into the dish of water. Wash them thoroughly, changing the water two or three times, and remove them to the fixing bath. From ten to twelve minutes will suffice for the fixing, but when finished they should have no mottled appearance when examined by transmitted light. From the fixing bath transfer them once more to water, give them one wash in this to remove the strongest of the hypo, then put them into fresh running water and leave them for about two or two and a half hours, giving them an occasional turn over. If a second lot should have to be toned it is better, after the first batch is in the fixing bath, to keep the right hand exclusively for the latter, and to do the toning and washing entirely with the left, as the slightest trace of hypo in the toning bath will completely ruin the prints. In this way the second lot can be toned while the first is being fixed. It is well to handle the prints by the corners as far as possible. The toning bath should not be colder than the temperature of an ordinary room during summer, that is about 65° Fahr. Toning should be continued until on looking through the print the dark parts are decidedly purple—that is, if a purple tone is required. If a brown tone is desired, then the dark parts should only have a faint purple tinge. For fixing, a weak solution of hyposulphite of soda should be employed, say about—

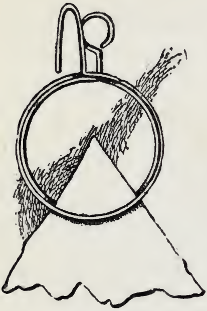


Fig. 48.

Hypo	2 ozs.
Water	20 ,,

The fixing bath should be alkaline—that is to say, it should turn red litmus paper blue.

Fixing should take about ten or fifteen minutes. If the hypo is acid, add a few drops of strong ammonia until it becomes alkaline. Allow the solution to stand for a while and filter through cloth.

Prints made by this process must not be dried between blotting paper, but laid out on a table or suspended from a string by means of American clothes pegs, or, better still, an appliance like that shown in fig. 48, which may be bought in boxes at the dealers.

A still more highly glazed surface can, if desired, be imparted to them by drying in contact with a sheet of what is known as ferrotype plate or, failing that, glass. If glass is used it must be very well cleaned and polished with French chalk. The prints are dried first, and then wetted again and placed face downwards on to the plate whilst wet. They are then squeegeed down with a roller squeegee, this appliance being shown in fig. 49. When the prints are dried they will probably peel off by themselves; if not, by loosening one corner they should come away readily. On no account attempt to remove them from the plate until

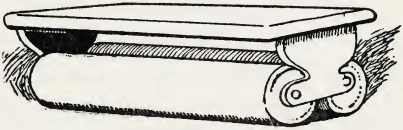


Fig. 49.

they are absolutely dry. By a similar process a matt surface can be imparted, substituting for the ferrotype plate or glass a piece of ground glass or opal, or what is called a pulp slab.

Gelatino-chloride paper seems to be very popular at present, but our advice to those who are not prepossessed in its favour is to try some other process, either bromide or platinotype. We consider that either of them is easier, and can be practised with more certainty of producing good results, whilst as to artistic appearance print-out paper takes a very inferior position.

BROMIDE PAPER.—The sensitive papers that we have written of previously print by daylight. Now we have to deal with a paper which is far more sensitive, and with which a few seconds' exposure to gaslight is sufficient to yield an image, this image, however, remaining latent until suitable developing solutions are applied.

It is true that some slower makes of bromide paper have during recent years been put upon the market, and with these it is possible to print by diffused daylight, perhaps half a minute being sufficient exposure. Even they, however, can be done also by gaslight.

We are, anticipating, however, and will at once plunge *in medias res*, describing first how to proceed with the quick bromide paper, which is to be obtained at any of the shops, in a large number of different makes, all excellent in quality, rough paper, smooth paper, and glossy surface being sold at the same price. As this paper is almost as sensitive as a dry plate, care must be taken not to open the packet excepting in the dark-room.

The first part of the procedure is to prepare the developer. The following metol and hydroquinone formula is recommended:—

No. 1.

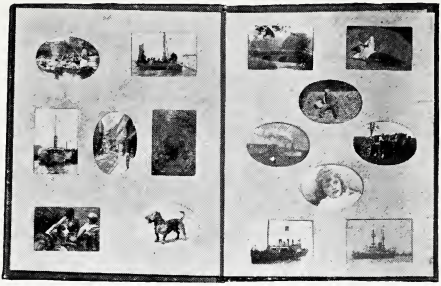
Metol	50 grs.
Hydroquinone	25 ,,
Sodium sulphite	1 oz.
Water, up to	20 ozs.

No. 2.

Sodium carbonate (crystals).	½ oz.
Potassium bromide	30 grs.
Water, up to	20 ozs.

The solutions are mixed in equal quantities just before use. Additional water may be added if a soft print is required.

The operator is now ready to proceed with printing. The negative is placed in the ordinary printing frame, the packet of paper opened of course in the dark-room), and a sheet taken out. The sensitive side may be identified by noticing which way the paper curls (curling is always towards the coated side), and this must be placed next to the negative. Now fasten up the printing frame, and do not forget to close the packet of paper again. Next hold the printing frame about a yard from the gas-jet, and turn up the light to its full extent. If you have no gas in your dark-room, then a lamp may be used for the same purpose (but in that case you may hold the frame about two feet away). Twenty seconds is about the length of time required in the case of a No. 4 gas-burner. For a lamp the exposure will probably be a little longer. Having counted the number of seconds carefully by the watch, turn down the gas immediately, for subsequent operations must be performed by the yellow or ruby light. Take out the print, place it in a dish containing water, so that it may become limp and soft. In a moment or two it may be transferred to the developing dish. The developer is then poured over it with a steady, spreading motion,



Fig, 54.

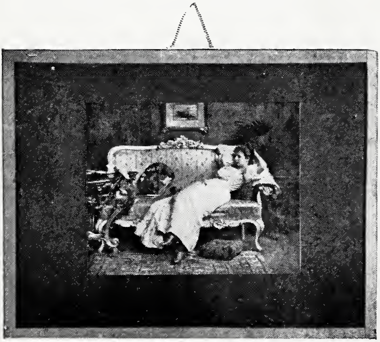


Fig. 55.

avoiding splashing, since that produces bubbles, and the dish is then quickly rocked to secure entire contact at all parts between the developer and the paper.

It is a good plan to have a broad camel-hair brush, which, saturated with developer, is drawn rapidly across the face of the paper, so that any possibility of air-bubble marks making their appearance may be entirely prevented. In a few seconds, if the exposure has been correct, the image will begin to appear. When it is sufficiently deep, withdraw from the developer and wash thoroughly in two or three changes of water for about five minutes, then place in hypo solution.

The usual fixing bath as for plates may be employed here—hyposulphite of soda 4 ozs., water 20 ozs. After fixing, washing (preferably in running water) should be continued for an hour or so.

Now, if the trial print you have made seems underexposed or overexposed, make another, giving it a longer or shorter exposure until you have exactly hit the length of time required. Then you may proceed to expose half a dozen negatives simultaneously, in order that the work may go on more quickly. The great advantage, in fact, of the bromide process is that a large number of prints can be made in a very short time.

When about a dozen prints have been made with the mixed developer, it will be wise to add a small quantity of fresh and pour away a corresponding portion of the old. Care must be taken not to handle the face of the prints when they are wet, or abrasion may occur; and there is also a liability of producing stains. The best plan is to take hold with the nail at the extreme corner. When the prints are fully developed they should be a strong, clear and brilliant black. The image should not appear very quickly; a normally-exposed negative should take from one to two minutes to become fully developed.

If a number of prints are developed and accumulated for half an hour or an hour before being put into the fixing bath, it will be well to place them for a short time in salt and water to make certain that development is stopped, otherwise the image may go on increasing slightly in density with the possibility of becoming too deep. Two ounces of salt may be added to 20 ounces of water, and as soon as the prints are removed from the developer they may be placed in this solution.

In the case of slow or gaslight bromide paper development may be carried on without a ruby or canary light, but simply in the light of a candle or a gas-jet turned down to about a quarter of its usual size. Of course one should not take the unfixed print very close to the source of illumination. The printing may be done by exposure to gas, when several minutes will be wanted; or to diffused daylight as obtained in a room with the blinds down or at some distance from the window, when a quarter or half a minute only will be needed. These points can only be ascertained by experience.

Bromide prints are, of course, black when developed in the ordinary way, but they can be turned to an effective sepia by the following treatment:—After fixing and washing in the usual way, bleach the print in a strong solution of mercuric chloride, just as in the case of intensifying a negative; then wash it very thoroughly. It may then be re-developed by immersion in ammonia solution, or fumed, which is a more interesting process and, on the whole, gives better results.

Take an ordinary cardboard plate box, put a piece of blotting-paper which has been saturated with strong ammonia in the bottom of it, take the wet print and blot off the superfluous moisture, and pin it to the lid of the box inside and shut it up. When the box has been covered for about three minutes it will be found that the print has re-developed and possesses a beautiful brown colour. It must then be thoroughly washed once more.

Other tones can be produced upon bromide paper by the application of different substances, but we cannot go further into the subject here. It may be well to mention, however, that the dealers supply in a very handy form tubes or tablets of chemicals for the purpose.

Bromide prints may be dried by first removing their superfluous moisture between blotting-paper, and then laying them out to finish drying upon a table, pinned to a wall, or hung by American clothes pegs to a string.

The ordinary white bromide papers are not so good for the best pictorial effects as the toned papers, which are also on the market. The toned papers simply consist of emulsion spread upon a cream-coloured paper instead of white.

Carbon Printing.—We now come to the carbon process, which in some respects is the most interesting of all those described, because of a certain mystery in the procedure and the simplicity of developing the image merely by hot water. When we first essayed the carbon process, now many years ago, we well remember how puzzling the price lists seemed, containing as they did such items as tissue, single transfer paper, final support, and so forth. We did not know what to buy. However, a friend assisted us out of the difficulty by explaining that all we needed was a dozen pieces of the sensitive tissue, costing in half-plate size tenpence, and a roll or band of single transfer paper, which is also the final support, costing three shillings. The latter had to be cut up into pieces rather larger than half-plate size to receive the tissue when printed. It is simply a good quality of paper prepared with gelatine, so that the tissue will adhere firmly to it. The roll will cut up to a very large number of pieces—we do not at the moment remember how many, sufficient anyhow to last for a long time. The process is practically an elaboration of the so-called "sticking dabs" of our childhood, which will be realized as we go along to describe the *modus operandi* from beginning to end.

Let us suppose we have ready to begin work a packet of sensitive carbon tissue. It is just about as sensitive to light as ordinary P.O.P., so we may venture to examine a sheet in subdued light—a few feet from the window. The sensitive side looks as though it had been coated with a kind of refined gas-tar, and is so dark in colour that no image will be visible when we have printed it. The easiest way to gauge printing is to place a strip of P.O.P. along the top or at the side of the negative in the printing frame—anywhere, in fact, so that it does not materially interfere with the subject. Or, if we have several negatives to print from of approximately equal density, we can put P.O.P. into one frame and carbon paper into the rest. When the one is sufficiently deep the others will be ready also ; but since carbon prints do not fall off in subsequent operations, as P.O.P. prints do, we must guard against carrying printing beyond that point where the P.O.P. has the strength and detail we wish the final carbon print to possess.

Now, having put up, say, half a dozen negatives at the window, we can whilst they are printing arrange what is necessary for development in the laboratory. We need, firstly, two basins, one containing cold water and the other hot, just as hot as you would use to wash your hands in if they were very dirty, that is about as hot as you could comfortably bear it. The nicest kind of basin to use is enamelled iron, such as are sold at all enamel shops; but, of course, earthenware will do practically as well, and for the time being we may borrow what we need in this direction from the kitchen, taking the precaution, however, before returning to thoroughly cleanse them. Next, we need a roller squeegee and a plate of glass or a flat clean board. The hot water must have its temperature maintained, so it will be well to have the kettle boiling near by, in order to add a little more hot water from time to time as the volume in the basin cools. But now the prints are ready for treatment. We take one out of the frame, whilst the others are put into a cardboard box until we are ready for them, and we plunge the one selected into the cold-water basin, putting in at the same time a piece of the final support or paper on to which it is to be transferred. The carbon print begins at once to curl inwards. As soon as it has rolled itself up we bend it gently back, and bring it in contact with the transfer paper—sensitive side inward, of course—and press the two papers together with our fingers, all this performance being done under water. We then take the two thus united out of the water, and, laying them flat upon the board, squeegee them into close contact. Do not be over-anxious about this squeegeeing; a few times to and fro will be ample. The next operation is to get rid of the superfluous moisture by placing between blotting-paper under slight pressure for about five minutes to ensure thorough contact, so that the film will stick to the final transfer, and not show any affinity for its first support when we go through the next part of the procedure. Now we put them into the hot-water basin, when in a few moments the colour or pigment in which the image is embedded should show signs of dissolving out at the edges. When this is seen, the time has come to venture to separate the papers. We slowly draw them apart, keeping them under water all the time. If they do not come easily, wait a little longer. If the paper be fresh, however, and the water properly hot, there should be no difficulty in separating the two papers, and leaving the carbon image firmly fixed upon the final support or transfer paper. The paper to which it originally adhered may be thrown away. Next to nothing is visible as yet. Now comes the most interesting part of the operation. With a small measuring-glass or a cup lift hot water out of the basin, and pour it on to the face of the print, holding it on the hand at the surface of the water, when the image will begin to appear as the gelatine in which the pigment is embedded begins to dissolve and is washed away.

You will observe that the picture is reversed, that is, objects on the left have been changed to the right and so on, just as though we were looking at it in a mirror. This is one disadvantage of the single-carbon process, and we may venture to say the only one. The objection can be surmounted by a process of double transfer, involving an additional operation or two, which we will explain in detail very shortly. Let us first, however, bring this single-transfer process to completion, for under ordinary circumstances reversed prints do well enough, and if they are portraits, why, it does not matter a bit. When all the gelatine has been washed away, and the image appears fully defined up to the margin, we rinse the print in cold water and then fasten it up by one corner to dry.

This is the whole of the process. Carbon tissue is obtainable in many different tints, but the most suitable for general purposes are the sepias, browns, and blacks; do not buy purples. One of the main advantages of the carbon process lies in this fact, that photographs may be produced in almost any tint, so that we may choose one suited to our subject. There are two firms who supply carbon materials—the Autotype Company, 74, New Oxford Street, London, W.C., and Messrs. Elliott & Sons, New Barnet, Herts. From either firm prices and instructions may be had free of charge.

Carbon paper will only keep ten days or a fortnight at the outside, unless a special storing box is purchased, when it may be retained for a longer period; but it is better in any case to buy only a small quantity and use it within a week or so. The paper can be obtained either sensitized or unsensitized, but the novice, at all events, should never think of purchasing it except in its sensitized condition.

The whole process is much more simple in practice than it appears in a written description, and the operations are so interesting in themselves that we have no hesitation in highly recommending carbon printing to the amateur photographer.

But now, before leaving this department of printing, we must explain what is necessary to obtain a print which is not reversed; for, although reversal is not a serious matter in many cases, where we have an architectural or topographical subject it cannot be tolerated, and the photographer must then choose between making a reversed negative or tackling the double-transfer process in its entirety. It may be thought that the easier way would be to make a reversed negative, but in practice, unless a large number of prints are required from the one negative, the double-transfer method comes in much simpler, and really only reasonable care is needed to perform the manipulations successfully. If a man can work the single transfer without a hitch, double transfer will cause him no trouble, because practically it only means a duplication of work. The print is first transferred from its original support to some temporary support, and then re-transferred to its final resting-place.

The following materials are needed in addition to those required for single transfer:—Some squares of matt opal a size larger than the size of the prints you are making. For half-plate 7 × 5 will do, for quarter-plate 5 × 4, or, better still, 6½ × 4¾. These are for the temporary support; the matt side is used, and gives a fine dead surface to the prints. Also a small quantity of enamel collodion, and finally some French chalk.

The first operation is to well wash the opal, and after washing dry it thoroughly and rub over with the French chalk to ensure perfect cleanliness. It is desirable to use a silk duster or a flat camel-hair brush to wipe off the chalk. Then, taking the enamel collodion, flow over each opal successively, just as you would do if varnishing. Lean them up to dry, and they will be ready in a few minutes. Or, in place of enamel collodion, the opal may be waxed with a solution prepared as follows:—One ounce of benzole, into which is shaken two ounces of yellow beeswax in shavings. When nearly dissolved, add one ounce each of ether and alcohol. Keep this solution in a stoppered bottle. Two or three drops of this solution dropped on to the opal plate and well rubbed will cover the whole. Be sure that it is well rubbed all over, and right up to the corners. Now take one of the opals and place it matt surface upwards in a deep dish, and with it the carbon print. When the print is well soaked, and immediately it begins to curl backwards, draw it on to the opal, and, letting the surplus water run off, cover with a sheet of blotting-paper and squeegee gently down. Place between dry. blotting-paper with a book or some other object on the top. After five minutes or so development may be started, and the print will appear in all its clearness on the opal. When the opal plates bearing the prints are dry, take a piece of the final support and immerse it in cold water until its surface becomes tacky, then remove to lukewarm water, and, pressing close to the opal, raise from the water and squeegee down as before, putting the plates under slight pressure for a few minutes. They may then be reared up to dry. When dry the prints will come away with the paper of their own accord; or if not, a very slight release with a knife at one edge will cause them to strip.

These are the necessary operations in brief. It may be well to issue one or two cautions. When coating the opals with collodion, balance the plate on the points of the fingers, and do not hold between finger and thumb, as any interference with the collodion on the edges may encroach on the area to be occupied by the print, and prevent its ultimate stripping. Do not attempt to accomplish the final stripping before the prints are perfectly dry.

CHAPTER VI.

TRIMMING, MOUNTING AND FRAMING.

❦

TRIMMING.—Well, we have got our prints, but the edges are untrimmed just as they come from the printing frame or from the washing water. They now need trimming and mounting or putting into some form of album. Trimming is not necessarily the very simple operation that the novice may at first imagine. It is usually insufficient to merely cut off enough at the sides to give a clean edge; other considerations must be taken into account. Very often a picture can be largely improved by cutting it to a slightly different shape, as, for example, making it narrower by taking off a good slice of the foreground or some of the sky. For an illustration of exceedingly desirable trimming we may look at fig. 50 (see opposite page 113). If a large amount of a most uninteresting roadway were cut away the interest would be concentrated on the main features of the picture and its shape decidedly improved, for, as a rule, the squarer a print is in shape the less pleasing it looks when mounted. Therefore, the first duty of the photographer before mounting his prints should be to carefully consider each one of them, and see whether any finishing operations of this kind can advantageously be performed. In order to facilitate this determination of size and shape, a simple arrangement made out of two pieces of card or paper

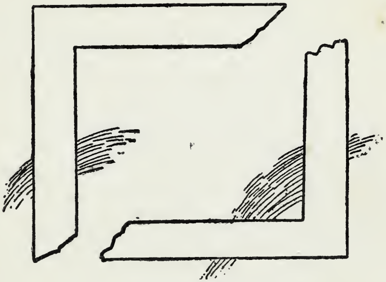


Fig. 51.

will be found valuable. Cut two L-shaped pieces, as shown in fig. 51, allowing their longer side to be long enough to extend well beyond the longer side of your prints. Then by placing these in the position indicated, and moving them about closer together or further away, you can cut off portions at the side or the top of the picture, and readily form an opinion as to where trimming is desirable and what particular portions to remove in order to give the print the most suitable shape.

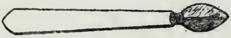


Fig. 52.

Uniformity in the dimensions of your photographs is not desirable from an artistic point of view. Other considerations, however, may possibly be an inducement to cut them to a fixed size, irrespective of pictorial aims, as, for example, if they form a series illustrating a special subject.

For trimming purposes knives and cutting shapes of glass are generally made use of. The ordinary form of trimming knife, as shown in fig. 52, may be obtained at the photographic depots for sixpence or a shilling, and glass-cutting shapes of various dimensions are also found at the photographic shops. But we strongly advise our readers to purchase a spring print trimmer, similar to that shown in fig. 53.

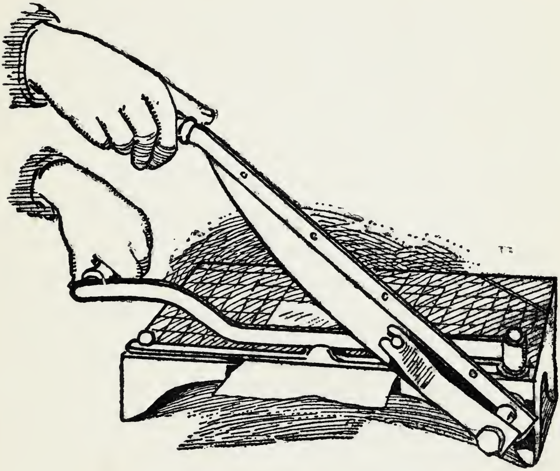


Fig 53.

This will cost, of course, a little more, though in its cheapest form only about half-a-crown, whilst a well made trimmer runs to eight or ten shillings. But the machine is so useful, not only for trimming but for cutting mounts, masks and other things required by the photographer, that we regard it as an almost essential part of the amateur's outfit. As will be seen from the illustration, there are cross lines on the bed of the machine, which enable you to trim prints with the greatest accuracy, and one can always be sure of getting a nice clean cut, whether the prints are trimmed when they are dry or whilst they are in a wet condition. In the old method of a knife and cutting shape there are several drawbacks. The knife soon becomes blunt. Unless the cutting shape is held firmly and pressed down tightly it will slip or the print will probably be cut with a jagged edge.

MOUNTING.—After trimming comes the operation of mounting. When we first started photography, now more than twenty years ago, our choice of mounts was limited to those used by the professional photographer, which at that time were practically restricted to thick gold bevel-edge cabinets and cartes-de-visite of green, chocolate and other singularly unfortunate colours. But to-day all these things are very different, and the amateur photographer has a great variety of appropriate mounts to choose from, though he can still get hold of crude and inartistic things if he particularly desires. The great principle in mounting is to consider each print separately, that is, of course, if one is mounting with a view of making the best of the particular print.

There are certain elementary considerations also which must not be lost sight of. Everyone should know that if a light print is placed on a dark mount it appears lighter, that if a warm-tinted print is placed on a cold-tinted mount it looks warmer, and conversely the opposite holds good. This point can be taken advantage of in numerous ways. For example, supposing that we have a snow scene to mount, if we put it on a white mount the probability is the snow will appear slightly degraded and a considerable modification of the wintry effect will be the result, but if we place this picture, which it is our desire to make appear as cold and as winterlike as we can, upon a mount of a warm brown shade, certain it is that the effect, by virtue of contrast, will be materially intensified. So also, if the print to be dealt with represents meadows and trees in the full glow of summer sunlight, it would be the wisest thing to select a cold neutral-tinted mount in order to emphasize by contrast the warmth and sunlight as much as possible. From this it naturally follows that it is best to buy a supply of coloured cardboard of different tints and cut it up according to one's requirements. For this purpose the lever cutter illustrated above answers admirably. By having several tints in stock one can try the print on this and that shade until one finds which colour enables it to be displayed to the best advantage. As a general rule, apart from the considerations mentioned above, a print should be mounted upon paper or card of a slightly darker shade than the print itself, and if a frame is added, that should be a little darker again.

But dealers keep in stock all sorts of cut mounts of different sizes, shapes and styles, some with borders, some with other designs, and the photographer need not hesitate to go in for these from time to time, as his circumstances may demand, guarding, however, against buying more than a small quantity of one particular style, the intention being to avoid a large number of prints which, when displayed, tire the eye by their very monotony, even though the subjects themselves may be exceedingly interesting, for it is an undoubted fact that the eye does soon get fatigued by looking at uniform sizes and a continuous range of similar colours. The expert lantern-slide lecturer knows how to please his audiences by varying slightly the tone of his slides, and precisely the same thing applies to a collection of prints.

The most expeditious kind of mounts that we can obtain in the ready-made form are those known as slip-in, where the print is inserted between two layers of cardboard or paper, and held in position by a small portion of its margin all the way round, thus dispensing entirely with the trouble of pasting.

Of late years the practice of mounting photographs upon stout paper has come very much into vogue. The superiority of paper over cardboard lies in its lightness and the smaller amount of space it takes up, so that where a photographer is the fortunate possessor of a goodly number of prints he can store them in smaller compass, say within the folds of a portfolio. Paper mounting is also cheaper. The novice may have some difficulty in mounting his prints in this way without finding them curl up and cockle when dry. Let him observe the following practical note :—If the photographs are pretty thick, that is on CC platinum, or the customary final support employed for carbon, or the stouter bromide papers, there is absolutely no necessity to do more than just touch the four corners with paste and press down to the mount with the fingers. To ensure flatness subsequent pressure under a board or between the leaves of a big book may be desirable. But if the prints to be mounted are thin, then wet the mount and allow it to curl a little, applying the print, well pasted to the convex side and squeegeeing well down. Leave under pressure till dry. The paste employed should always be stiff, and as free from superfluous water as possible. It should be used sparingly and well rubbed in.

The best paste to use for mounting on paper, and indeed for any kind of mounting, is a kind usually sold in screw-topped bottles, for which unfortunately no specific name has been adopted, but the paste is more like salve than the ordinary watery stuff made from flour, and it sticks very tenaciously. For mounting a double-roller squeegee is a very handy tool, because with it one can apply a great amount of pressure if necessary.

Paper mounts also admit of a particular style of mounting which has been recently introduced from America, and is familiarly known as the American or superimposition style. As well as we can describe it, it consists of first mounting a print with a comparatively narrow margin of some rather strongly coloured paper. Outside this there may be a second narrow margin of another colour of paper which contrasts suitably with the inner margin. In some cases we have seen even a third margin of yet another colour. Last of all the print thus treated is placed upon a much larger mount of neutral shade. Its position on this mount is also an important factor in the æsthetic appearance of the whole. If the foreground is a little weak one would place it high upon the mount, so that there shall be a fair amount of "tail" below. If, however, the foreground is strong the print might be placed about the middle of the mount. If the subject is a portrait side face, then much more margin should be left on that side to which the face is directed, so as to add a kind of balance to the picture. We cannot go further into the subject here, but must content ourselves with saying that this method of mounting offers variety and freedom to the photographer and a means of improving the appearance of his pictures that cannot be accomplished in any other way. At the same time the novice must be cautioned against rushing wildly into the practice of this kind of mounting, or he will be sure to perpetrate some inharmonious effects calculated to do more harm than good to his work.

It is beyond our scope here to lay down further rules for his guidance. The best thing to do is to take a lesson from an experienced friend, or to study pictures at exhibitions that have been dealt with in this way.

ALBUMS.—Amateurs who mount their prints on paper, either with the embellishments of the American school or plainly and simply, can obtain from the dealers portfolios of various sizes, in which prints may be stored in order to keep them flat and prevent them from becoming soiled. But some have found the portfolio method of keeping prints open to, at any rate, one disadvantage—the facility with which a single print may be abstracted. Not that we would go so far as to imply dishonesty on the part of the amateur's friends, but the ease with which a print may be taken out of a portfolio probably goes a long way towards making them feel pretty confident that if they ask for a specimen of his work they cannot well be refused. The alternative, then, is the album, and of albums, just as of mounts, no end of varieties are now to be obtained. One can either paste down the prints or mount them loosely by paste just at the corners, or again by gummed strips of paper at the corners, after the fashion of fixing stamps in an album, or for ease and rapidity the slip-in album recommends itself.

There is also the particular type of album which has become known under the title of "Sunny Memories" (fig. 54, see opposite page 128). This pattern was first devised and made many years ago by the writer of this book. Now there are a large number of different kinds on the market, and they can be obtained everywhere. In the case of this album, instead of mounting direct on to the paper the prints are fastened on to a thin sheet of cardboard over which a sheet of paper, pierced with openings of different sizes and shapes, falls, so that the print may be placed behind that aperture which seems to suit it best. It follows, then, that one can mask one's pictures to oval, round and other shapes without the trouble of cutting them. The prints are fastened down to the cardboard base by strips of gummed paper across the corners, out of sight when covered over with the pierced leaf. Different pages are of different colours of paper, so that a bromide or platinotype, or whatever may be the particular kind of print, can be placed under that shade that suits it best. The placing of prints in an album like this involves rather more trouble than in the case of the slip-in form, but the *ensemble* is infinitely more pleasing and impressive.

FRAMING.—Now we come to the question of framing, and it will not be possible in the scope of this book to do more than give just a few hints. As a rule, the ordinary shop mouldings made of paste, with elaborate patterns upon them, should be rigidly avoided, neither does plain unstained oak, either reeded or flat, form a suitable surrounding for photographs. Ordinary flat oak frames may pass if they are stained to some suitable dark tint, but the best kind of frame to get for a photograph, and we are glad to say that some few picture dealers are beginning to keep the particular sort referred to, is one with the moulding sloping gently inward, either with or without a slight curve. Stained to various dark shades, to contrast or harmonize with the picture it is to contain, such a frame looks remarkably well upon the wall. Let us advise the photographer not to attempt to frame photographs on glossy paper. They are all very well for hand specimens, but they do not give a good impression upon the walls of a room, being out of harmony with the rest of the furniture, and reflecting so much light that at a little distance they usually appear to be mirrors. It is also sound advice not to put more than one print in a frame.

In framing the rule is (though to all rules there are exceptions) that a narrow moulding requires a broad mount, a broad moulding no mount at all, but with the photograph framed flush.

With these observations we will pass on to describe a simple method of framing that any novice can undertake for himself at the cost of a copper or two for each picture. It is particularly effective for small pictures, mounted in the American style, and is really an old French idea revived and improved. A mounted print, preferably one mounted on paper or card with a fairly wide margin, is placed behind a piece of glass, together with a cardboard back of exactly the same size. These three, the print being in the middle, are then bound together by means of gummed paper, much in the fashion of a lantern slide. To complete the *passe-partout* frame, as it is called, a small piece of coloured tape as a suspender should be fastened behind, and the effect is then as seen in fig. 55 (see opposite page 128). Old negative glasses, if of suitable size, may be, of course, utilized for the purpose.

Let us describe the exact method of procedure. Take a small sponge, a basin of water, a flat hog's hair brush, a pair of scissors and a supply of black or dark-coloured binding strips, preferably about half as broad again as the ordinary lantern strip. Such broad strips are now to be obtained especially for this purpose from most dealers. Now placing one of the glasses flat upon the table, moisten the binding strip well with the sponge, take hold of it with both hands, and apply to the edge of the glass, rubbing down with the fingers until it sticks firmly. Care must be exercised to get an even margin all the way on, and, of course, each strip applied should cover an equal width. Having done the four sides successively, the

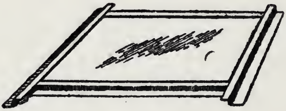


Fig. 56.

appearance of the print will be as in fig. 56. Turn the glass over and hold it with one hand, cutting the corners out as shown in fig. 57. Now examine the inner side of the glass for finger marks, and carefully rub these off with a dry cloth, if present. Then place the picture in position and the cardboard back above it (no need for a back if the print itself is mounted on

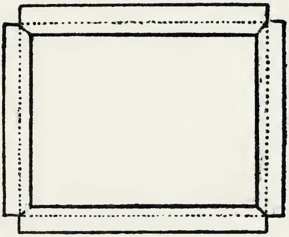


Fig. 57.

stout cardboard). With a broad brush dip in water, moisten that portion of the binder extending beyond the glass thoroughly, and at once take hold of the paper whilst wet, bend it over and draw it tightly on to the back. Before doing the other three sides the picture should be examined from the front to see that it is quite in a central position and straight, as a very slight inclination one way or the other looks very bad afterwards. The whole of the sides having been sealed, the corners may then be examined, and if there are any little slits a very small piece of the gummed paper may be put over them. The *passe-partout* is now complete except that it requires a suspender. Cut about 3 in. of dark-coloured tape, bending it in the form of a loop, glue it down to the back with a strip of gummed paper or cloth, as shown in fig. 58. All that remains to be done now is to rub over the front of the glass to remove any finger marks.

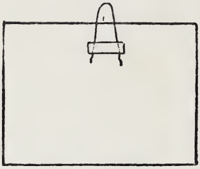


Fig. 58

CHAPTER VII.

LANTERN SLIDE MAKING AND ENLARGING.

❧

LANTERN SLIDES.—Lantern slide making is perhaps one of the simplest operations in photography, and, at the same time, one of the most enjoyable; and perhaps no form of photograph is capable of giving so much pleasure to a number of people simultaneously as a good lantern slide displayed by means of an optical lantern. We strongly advise every photographer to take up slide-making as soon as he has become fairly conversant with the preparation of negatives and prints. Magic lanterns are much cheaper than they used to be; an oil lantern suitable for use in a small room can be had for 20s. or even less, whilst if one is a member of a club where a lantern is in use almost every week, it is an easy matter to get one's slides displayed, even if the amateur has not reached a sufficiently high state of evolution to deliver an illustrated lecture himself.

There are two ways by which slides may be made—the direct method and by reduction with a camera. The uniform size of all lantern slides is 3¼ × 3¼, so that with the direct method whatever portion of the negative is larger than the slide has to be left out. In the case of quarter-plate, which is an inch larger than the lantern slide in one direction only, this is not a serious matter, but when it comes to half-plate or larger sizes the sacrifice of so large a portion is often a serious loss, and frequently makes it quite impossible to utilize the negatives at all. On the other hand, it often happens that, by judiciously selecting a small portion from a larger negative, very charming little pictures can be made.

For the reduction process the negative is fixed in a specially prepared camera, which can be bought to fit the particular size of negatives which the photographer wishes to reduce. These cameras are remarkably cheap, and no one who wishes to make slides need be without one; or the photographer may construct an arrangement for himself by utilizing his own camera for the purpose, with the addition of a sort of long box fitting on loosely at the front. Instructions for the making of such a form of apparatus are to be found in most books on lantern matters.

Let us describe the exact procedure necessary for making slides by the direct method. Having bought a box or two of lantern plates, and selected those negatives from which you wish to work, go into the dark-room, place one of the negatives in a printing frame (preferably with a piece of strong glass in front to prevent risk of breakage), and then laying the film side to the negative, adjust it to the right position. Carefully clamp up the printing frame, and you are now ready to expose. Special printing frames for making lantern slides are now made, and the particular kind supplied by Messrs. Butcher & Sons can be highly recommended. Give an exposure of ten seconds at one foot from an ordinary gas flame. If the result on developing is found to be over or under-exposed, then a second or two more or less will give you the correct time with the next plate.

Now for the developer. The most simple is undoubtedly hydroquinone, and it gives such good results that most people never use any other. Make up the following two solutions:—

A.

Hydroquinone	80 grs.
Bromide of potassium	15 ,,
Sulphite of soda	1 oz.
Water to	20 ozs.

B.

Sodium hydrate..................	30 grs.
Water to	20 ozs.

For use, mix equal parts of each. No clearing solution is necessary in the case of hydroquinone. The plate is sufficiently developed when on holding it up to the canary light the image appears the least bit darker than it is ultimately desired to be. Now place in the fixing solution, consisting of hypo 5 ozs. and water 20 ozs. The plates fix rapidly, and as soon as finished they must be washed in running water for about half an hour, or frequently changed water for about two hours. Be careful to avoid bubbles in development. If any appear, touch them with a camel-hair brush, or remove gently with the tip of the finger.

The exposure and developer described above will give a black-toned slide. Warmer tones can be obtained by increasing the exposure and modifying the developer, as indicated in the following formulæ and instructions. For warm black tones, make up developer according to the quantities here given :—

A.

Hydroquinone	640 grs.
Soda sulphite	8 ozs.
Potassium bromide	120 grs.
Water	80 ozs.

B.

Sodium hydrate	640 grs.
Water	80 ozs.

As before, take equal parts of A and B. As in the previous case, the image should appear in about half a minute, and reach full density in about two minutes. Some people seem to think it is a good plan to have all the slides illustrating any particular series or district or subject, in one uniform tone; but we think this is a great mistake. The proper and sensible way is to adapt the tone to the subject; some views look better in a warm tone than in a cold one, and *vice versa*. Besides, after seeing several slides in one particular tone, it is quite a relief to the eye to rest on one of a different shade; hence the more variety of tones we can obtain in reason the better. The next formula is for warm brown tones:—

A.

Pyro	1 oz.
Soda sulphite	4 ozs.
Water	80 ,,

B.

Carbonate of ammonia	900 grs.
Potassium hydrate	750 ,,
Ammonium bromide	600 ,,
Water	80 ozs.

Equal parts of A and B. Length of time in developing as in the last case. This tone is very suitable for many landscapes, especially of woodland scenery in spring or autumn. It will not look well, however, with snow scenes, which are best cold black in tone, and ought never to be made in any other. An alternative formula (No. 4) to produce warm brown tones may be made by taking equal parts of A and B in No. 2 formula, and adding to each ounce of developer thus mixed 3 grains of ammonium bromide. In this case development will occupy from three to four minutes.

In the case of making lantern slides by reduction development is, of course, exactly the same, but exposure is very much longer. In most of the reducing cameras sold the focus is fixed, and the stop employed is *f*/16, so that one may give fairly approximately the correct exposure for negatives in the camera exposed to a bright light. The time necessary will be found to be about ten seconds, or from that to twenty. Of course, the lantern plate is put into position in the dark-room and the camera closed up, and carried out to the nearest window without shaking, lest the negative should be slightly moved and a double image so produced. The negative must be placed in the camera with the film side inward; the lantern plate, of course, with the film side towards the negative.

Lantern slides are finished by placing a square piece of thin clean glass upon the film side of the lantern slide, and binding the edges together with gummed paper. In order to obtain an even outline on the screen, it is customary to place between these two glasses what is termed a mask, which is a suitable shape cut out in black paper. Both lantern masks and strips of paper for binding are sold by all dealers.

But in lantern slide making much depends upon certain finishing touches and subsequent additional processes. The finishing of lantern slides involves a considerable exercise of art, and just as in ordinary prints the artist is proclaimed by the tint of paper, style of frame, and other details, so in lantern slides he is to be perceived by shape of mask, tone of slide, and perfection of minor detail.

Though not strictly one of the finishing operations, the printing-in of clouds on to lantern slides is essential in landscape work if they are to be marked by artistic quality.

Clouds may be printed direct on to the slide, or, which is easier and more certain in result, on to another slide which is used as a cover-glass. We will describe the latter method only. A good and suitable cloud negative is chosen from our stock, care being taken not to commit the anachronism of fitting a noontide sky to an evening scene, or any such stupid performance. A slide is made from this cloud negative in the usual way, attention being given to the tone, so that it shall correspond with that of the landscape. When finished, hold it over the slide film to film, and observe where the sky encroaches upon the landscape, marking it at each side with a pin. Then, by means of the potassium ferricyanide reducer, remove all the portion not required, and, after washing and drying, the two are bound up with their faces towards each other.

In developing lantern slides a camel-hair brush is a useful tool. It can be employed to apply strong developer to weak parts of the image, thus equalizing the whole slide. To perform this operation the slide is removed from the developer, the special parts quickly brushed over, and then plunged into the developer again and steadily rocked. On this principle the actual sky may often be brought out, and the natural sky is almost always preferable to one introduced by the means described above. In thus applying strong developer incline the slide so that the solution cannot run on to the dense parts. One who is comparatively inexperienced in lantern slide making would often throw away slides which are under or over-exposed. Unless, however, the plate is absolutely at one extreme or the other, it can usually be redeemed and converted into a first-class slide by either intensification or reduction, and often improved in tone as well, by the process.

Supposing, for instance, you have a slide which, underexposed in the first place, has been developed for a long time, and thus become slightly stained by hydroquinone or pyro. If placed in a solution of mercuric bichloride, the yellow stains disappear, and slight intensification takes place *immediately*. This may improve the slide to such an extent that no further treatment is necessary beyond thorough washing. If, on the other hand, it be left for five minutes or so in the mercury bath, the image bleaches until it is almost imperceptible. After very well washing, it may be re-developed in a dilute solution of sodium sulphite or of ammonia, the latter giving the strongest reaction, and producing a fine brown shade eminently suited for evening effects or for interiors of old buildings. On the other hand, an over-dense slide may be reduced by the usual potassium ferricyanide and hypo solution; first locally by means of a wad of cotton wool, and then entirely, if necessary, by immersion in the solution. The most satisfactory plan of operation is to soak the slide in water, pour a teaspoonful of hypo solution into a watch-glass, and add a few drops of potassium ferricyanide solution. Then, dipping the brush or cotton wool into it, apply cautiously to the slide with a rapid circular motion, washing off from time to time by holding under a tap, so that the action may be examined and not carried too far. After reduction the slide should have half an hour's washing in running water.

Slides can often be greatly improved by staining with aniline dyes. A strong solution of coffee will impart a yellow glow suggesting admirably the appearance of sunlight. This stain is particularly valuable for improving cold-toned slides. Sea views may be tinted green, moonlight scenes blue, and so on; but the operator must guard against making the colours too strong, or he will entirely spoil the effect and obscure the transparency of the slide. An infinitesimal quantity of the dye in powder will make sufficient solution to cover a lantern plate. The dish should be rocked to avoid uneven staining. If there are any undissolved particles of dye in the solution they will disfigure the slide, so it is a wise precaution to filter after dissolving. Thin slides are often greatly improved by staining.

No slides should be considered finished without having been submitted to an alum or formalin bath (preferably the latter), in order to properly harden the film. The powerful heat of a mixed jet, combined with long exposure in the lantern sometimes necessary, is liable to slightly melt the film, or to produce, as our own experience has proved, small blisters, which will wholly or partially disfigure the slide. Five minutes in the formalin solution of one part to nine parts of water effectually prevents any occurrence of this character. It is also necessary to thoroughly dry the slide before covering and binding, as if the slightest trace of moisture is left between the glasses the heat of the lantern will vaporize it and produce an unexpected mist effect, if it does not actually cause blisters and entirely spoil the slide.

Before we conclude this part of our subject, let us say a few words on the subject of lantern masks. In theory every slide-maker ought to cut his own masks, and cut them just to the size which best suits the particular view. Nothing could be more foolish than to mount every slide with a mask of the same shape and size. Many pictures are improved by cutting off a considerable portion of one side or the other, and every slide ought to be examined carefully to see whether any such portion ought not to be omitted. Some subjects look better upright, others oblong. Square-cornered masks are best in seventy-five cases out of a hundred; but there are occasions when one may venture to employ a dome shape or rounded corners—as, for instance, in interiors—and the circle or oval is often better for a landscape where there are a good many straight lines. But all this work needs doing with great discrimination: the difference in effect produced by a series of slides properly and improperly treated from an artistic point of view is sufficient to make or mar the real success of a lantern lecture.

ENLARGING.—We can only deal in this book with enlarging in its simplest forms—that is to say, as it may be practised by the comparative novice with such apparatus as may be purchased very cheaply, or by means of a home-made outfit.

There are two ways in which enlarging may be done, by daylight or by artificial light, and according to which of these methods is decided upon the apparatus and its arrangement varies slightly.

We may safely say that it is better to use daylight if convenient so to do; but if the amateur has little or no time to spare during the hours of daylight, or if he cannot find a suitable attic in the house to give up to his apparatus, then he will be wiser to go in for enlarging by artificial light.

Let us first take up the daylight question. For this purpose the only essential appliances beyond the camera—which we presume is already in the possession of the student—are a long board measuring about a couple of yards by 12 or 18 inches, and an upright board or easel (a drawing-board will do), which is intended to hold the paper or plate upon which the enlargement is to be made. Since the room to be used for enlarging becomes for the time being a dark-room, the window or windows must be entirely blocked up, with the exception of one small opening exactly the size of the focussing screen of your camera. We will suppose that we are dealing with a half-plate camera. The window may easily be blocked up in a similar way as for the temporary dark-room (described in Chapter II.); but, instead of that exact arrangement, let the canary window be higher up, and lower down upon the screen and as near to the bottom of the window as possible, cut an opening exactly 6½ by 4¾ in size. Now, placing the camera upon the long board aforesaid, and, raising this board horizontally by means of boxes or chairs, or whatever you may have by you, bring it against the window after the manner shown in Fig. 59. Then propping your drawing-board in a vertical position by means of a couple of thick books or a block of wood or any other means, pin a sheet of white paper to it. If now you put a negative in the dark slide, place that dark slide in its usual place in the camera, and open both the shutters, you will find an image projected upon the screen which you can make any size by focussing the camera and pushing the drawing-board to and fro along the temporary table. Should any stray light make its way in where the camera is against the window, it is easy to keep it out by means of a cloth.

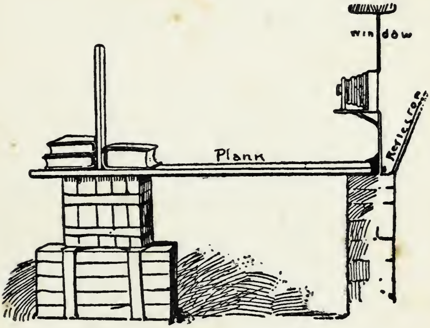


Fig. 59.

In this manner, then, you have constructed a rough but effective enlarging apparatus. The distance of the easel from the lens for a particular size of enlargement may be found, as we have already indicated, by experiment; but there are tables given in most text-books on enlarging which determine this position exactly according to the focus of the lens. We do not think, however, we need trouble our readers with them here.

Then comes the question of focussing. This must be done pretty carefully, and then in order to get a sharp image it is well to turn the diaphragm to *f*/32. The enlargement may be made direct on to bromide paper, or, on the other hand, we can make an enlarged negative from which prints can afterwards be obtained by contact in the printing frame; but the bromide method is decidedly the best for beginners, so we shall deal with that only.

Next, in preparing for the exposure, mark the position of the image on the paper you have pinned to the easel, and put a cap on the lens. Then, taking a sheet of bromide paper from its envelope, fasten it on to the easel, being cautious about getting the right side towards the lens. Then comes the exposure. This should have been determined beforehand by experimenting with a small piece of paper; but, very roughly speaking, about a couple of minutes should be required with *f*/32 when the light is good outside. Development, of course, is the same as already described for bromide paper in Chapter V.

One or two more hints may be given before we pass on. If there are buildings opposite, a reflector of cardboard or glass should be fixed at such an angle outside the window as to throw clear and unshadowed rays of light through the camera.

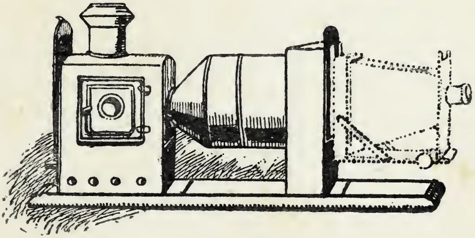


Fig. 60.

When we come to deal with enlarging by artificial light, we can utilize a magic-lantern, taking the precaution of covering it partially with a box, or something of the kind to prevent any indirect light escaping, and consequently fogging the enlargement. Or on the other hand, we can purchase one of the cheap enlarging lanterns shown in Fig. 60, by which means either gas or oil may be employed as an illuminant, and the photographer's own camera is attached in the manner shown. Of course, complete forms of enlarging apparatus may also be purchased, obviating the use of the photographer's ordinary camera. The apparatus is placed at one end of a table, an easel being rigged up at the requisite distance from it just as previously described for daylight work, and the procedure in other respects is precisely similar. The exposure will probably need to be about twice as long.

APPENDIX.

BURTON'S TABLE OF EXPOSURES, showing relative length of exposure at different times of day and months of year:—

Hour of Day. A.M. P.M.	June.	May or July.	April or August.	March or Sept.	Feb. or Oct.	Jan. or Nov.	Dec.
12	1	1	1¼	1½	2	3½	4
11 or 1	1	1	1¼	1½	2½	4	5
10 or 2	1	1	1¼	1¾	3	5	6
9 or 3	1	1¼	1½	2	4	*12	*16
8 or 4	1½	1½	2	3	*10	—	—
7 or 5	2	2½	3	*6	—	—	—
6 or 6	2½	*3	*6	—	—	—	—
5 or 7	*5	*6	—	—	—	—	—
4 or 8	*12	—	—	—	—	—	—

* The accuracy of these figures will be affected by a yellow sunset.

SHUTTER SPEEDS.—The following table, from "A Reference Book of Practical Photography," by F. Dundas Todd, gives the speed which a shutter should work at for common moving objects. The objects should be at the following distances:—For a six-inch focus lens at 50 feet, a seven-inch at 58 feet, an eight-inch at 67 feet, a nine-inch at 75 feet, or twelve-inch at 100 feet.

	Towards the camera. sec.	At right angles to the camera. sec.
Man walking slowly, street scenes	1-15th	1-45th
Cattle grazing	1-15th	1-45th
Boating	1-20th	1-60th
Man walking, children playing, etc.	1-40th	1-120th
Pony and trap, trotting	1-100th	1-300th
Cycling, ordinary	1-100th	1-300th
Man running a race and jumping	1-150th	1-450th
Cycle racing	1-200th	1-600th
Horses galloping	1-200th	1-600th

If the object is twice the distance, the length of allowable exposure is doubled, and *vice versa*.

WEIGHTS, MEASURES, ETC.—The following rough methods of arriving at quantities, though not absolutely correct, are useful when weights are not at hand:—

1 threepenny piece = 1 scruple
1 sixpenny piece = 2 ,,
1 sixpenny and 1 threepenny piece = 1 dram
1 two-shilling piece = 2½ ,,
1 sovereign = 123 grs.
1 shilling = 87 ,,
48 pennies = 1 lb. av.
1 halfpenny and 1 threepenny piece = ¼ oz.
1 florin and 1 sixpence = ½ ,,
3 penny pieces = 1 ,,
4 half-crowns and 1 shilling = 2 ,,
4 florins, 1 half-crown and 2 pennies = 4 ,,
1 teaspoonful = 1 dram
1 dessertspoonful = 2 ,,
1 tablespoonful = 4 ,,
1 wine glass = 2 ozs.
1 teacup = 6 ,,
1 tumbler = 10 ,,

CYCLOPÆDIA.

Aberration.—A term used in optics to denote the different refractions of rays of light in passing through a lens. *Chromatic aberration* occurs in single lenses of the "spectacle glass" type, and is caused by unequal refraction of the chemical and visual rays. It is corrected by combining lenses of different kinds of glass. *Spherical aberration* is the greater refraction which rays passing through the edge of the lens undergo, as compared with those passing through the centre, so that when the lens is used at full aperture only the central portion of the image is sharp.

Accelerator.—Any substance added to the developer for the purpose of making its action on the image more rapid. Potash, soda and ammonia are among the accelerators usually employed, but raising the temperature of the developer has also a hastening action.

Achromatic.—Term applied to lenses which have been corrected for achromatism, and which are therefore free from chromatic aberration.

Actinic.—A term applied to rays of light capable of acting upon a sensitized surface. Sunlight, when broken up into its constituent colours, contains yellow and red rays, which are non-actinic, and violet, indigo, blue and green, which are actinic to almost all prepared photographic surfaces.

Albumenized Paper.—Paper treated with a preparation of albumen prior to being sensitized by floating on a silver-nitrate bath. Paper prepared in this manner was, until gelatino-chloride or print-out paper came into use a few years ago, the popular printing paper, and even now it is extensively used in many quarters.

Alcohol.—A colourless spirit obtained by distilling fermenting liquor. Used for many purposes in photography, in the manufacture of collodion, varnishes, etc. *Methylated spirit*, or alcohol to which wood naphtha has been added (in order to make it undrinkable), is employed for drying negatives quickly, for removing stains from them, or varnish which has spread on to the glass side. To dry a negative quickly, place it, after the usual washing to remove hypo, in a dish and pour methylated spirit over. After a few moments' soaking, remove and place on end.

Alkali.—Term given to certain substances in chemistry, which have the property of neutralizing and forming salts with acids. Alkalies turn litmus paper blue. They play an important part in development, acting as accelerators.

Amidol.—A developing agent; may be used either for plates, lantern slides, or bromide paper. Usual formula for plates :—

Amidol	60 grains.
Sodium sulphite	1½ ozs.
Water..........................	7 ,,

Mix one part of above with three parts water, and add a few drops of a 10% solution of potassium bromide. For the development of bromide paper amidol can be highly recommended, when the above solution should be more or less diluted.

Anastigmatic.—A term used in application to lenses which have been corrected for astigmatism and are free from spherical aberration.

Angle of View.—The angle included by a lens on a given size of plate. The human eye can only include an angle of about forty or fifty degrees, but some lenses are made to take in over a hundred degrees—that is, more than a right angle. Excepting for special purposes, lenses of a greater angle than forty degrees should not be employed.

Aperture.—The *working aperture* of a lens is in practice regarded as the diameter of the lens opening when the diaphragm is fully open or when no stop is inserted.

Aplanatic.—An optical term applied to a lens, meaning that it has been corrected for spherical and chromatic aberration, and will give sharp definition at full aperture.

Backing.—The thinness of the film on ordinary dry plates gives rise to halation, which can be modified or avoided by the use of "backing" applied to the glass side of the plate. Backing can be made as follows :—

Gum-arabic	1 oz.
Powdered burnt sienna	1 ,,
Water	6 ozs.

Apply the solution with a brush. Remove with a damp sponge before development.

Blisters.—Blistering films occur very rarely with plates, but more frequently in the case of sensitive papers. They may be suppressed in plates by plunging at once into methylated spirit. For papers a saturated solution of common salt may be employed, into which the prints are immersed. Blistering, as a rule, may be avoided by maintaining all the solutions in use at an equal temperature. For gelatino-bromide papers the following bath is recommended :—Alum, 2 grs. ; water, 1 oz. ; methylated spirit, 1 oz. Formalin is also useful as a preventive.

Blue Prints.—The name given to prints made by the cyanotype process. To prepare cyanotype paper, mix the following solutions :—

A.

Ammonio citrate of iron	90 parts.
Water	300 ,,

B.

Potassium ferricyanide	80 parts.
Liquor ammonia	7 ,,
Water	300 ,,
Saturated solution oxalic acid	60 ,,

Mix A and B in equal parts, filter, and keep in the dark. Any good, smooth, white paper may be used. Spread the solution with a broad brush, working first one way and then across to take the marks out. Dry before use. Develop by washing in warm water.

Calcium Chloride.—A highly deliquescent substance, having a marvellous affinity for water, and therefore employed for drying or keeping dry. Platinum paper is sent out in tubes containing a small piece of calcium chloride to absorb the moisture so injurious to that paper.

Canary Medium.—Yellow-coloured cloth or paper used for producing a non-actinic light for the dark-room.

Caramel.—Burnt sugar which does not crystallize. Used in conjunction with gum for coating the backs of plates as a preventive of halation.

Carbolic Acid.—Employed as a preservative in solutions of gelatine or albumen, and for mountants.

Carrier.—A wooden framework placed in the dark slide of a camera to hold a smaller plate than the full size.

Celluloid.—A transparent substance of complex composition, made by adding pyroxylin to melted camphor, compressing the two substances, dissolving them in a mixture of ether and alcohol, and evaporating. It is used as a support for films, and also in the preparation of varnishes.

Chromatic Aberration.—A simple lens has two *foci*—one the visual, at which all rays one can see come to a point; the other the chemical, at which those rays meet which produce the chemical changes in the plate. If, therefore, a simple lens is focussed in the ordinary way, the resulting negative will be out of focus, and on this account when using a spectacle lens it is necessary, after focussing, to rack in the lens very slightly, so as to bring the chemical rays into play. Ordinary lenses are corrected for chromatic aberration, as this defect is called, by the combination of two or more simple lenses of different shape and quality of glass.

Clearing Solution.—Employed to remove the stains of development from either negatives or developed prints, especially lantern slides and bromide paper. The usual formula is as follows:—Alum, 2 ozs.; citric acid, 1 oz.; water, 20 ozs.

COLOUR SCREEN.—A piece of glass coloured to a special tint for the purpose of using in the camera, in connection with orthochromatic plates, in order to secure correct tone values of coloured objects.

CONDENSER.—A pair of plano-convex lenses, mounted in brass, employed in connection with the enlarging lantern, for gathering the rays of light together and concentrating them at a point in the lens which projects the image.

CONJUGATE FOCI.—The near focus and the distant focus of a lens are termed conjugate foci. For further information on this point, see Focus.

CURVATURE OF FIELD.—The marginal rays of a lens are more refracted than those at the centre, which produces on the flat screen or plate an image sharp in the centre, but more or less blurred at the margin. This defect is termed curvature of field. It is avoided to some extent by combining different lenses, and also by using a stop. The defect is greater with lenses of short focus than with those of long focus.

DEFINITION.—The defining capacity of a lens, or its power to produce an accurate, clearly defined image upon the screen.

DELIQUESCENT.—Having the property of becoming soft or liquid by absorbing moisture from air. Calcium chloride has this power in a remarkable degree, and is therefore placed in the tubes in which platinotype paper is stored.

DENSITY. — The degree of opacity of the negative image.

DEPTH OF FOCUS.—The capacity of a lens to render with equal clearness objects near to the camera and far away. The smaller the diaphragm used the greater becomes this depth.

DISTORTION. — Some forms of lenses give distorted images. The most usual form of distortion is produced when lenses of very wide angle are employed. Near objects then become disproportionately larger than remote ones. The distortion of parallel lines is produced when a high building is taken and the camera is tilted, unless the swing-back be used to counteract the effect. The other forms of distortion are produced by refraction at the margin of the lens, in which case lines which should be parallel appear to run together or separate, producing what is called barrel and spectacle distortion respectively.

Eikonogen.—A sodium salt of complicated composition used as a developer, and acting in practice similarly to hydrochinone. The usual formula is:—

A.

Sodium sulphite	4	parts.
Water	60	,,
Eikonogen	1	,,

B.

Water	20	,,
Sodium carbonate	3	,,

Take three parts of A and one part of B, mixing them immediately before use. The eikonogen must be powdered or dissolved in hot water.

Emulsion.—The term applied to a mechanical mixture of a sensitive silver salt finely divided and held in suspension in some viscous substance, such as gelatine, albumen or collodion, intended to be spread out in a thin film upon glass or paper and dried.

Enamelling.—Prints may have a smooth, glossy surface imparted to them by placing face downwards upon a clean sheet of ferrotype tin and squeegeeing. When dry they will peel off themselves. A glass plate may be used in place of the ferrotype sheet, but it must be carefully cleaned and dusted over with French chalk.

Films.—The thin layer of emulsion of a plate is, strictly speaking, the film, but the term is also applied to celluloid as distinguished from glass plates.

FLARE SPOT.—A defect in a lens whereby the image of the diaphragm aperture or of the lens itself is thrown on to the plate itself. Sometimes the defect is due to the glass of the lens, but as a general rule it can be avoided by painting the inside of the lens tube and the diaphragm with dead black.

FLASH-LIGHT.—When an artificial light is produced by suddenly igniting magnesium powder, or some other substance emitting a bright flame, it is called a flash, and this method of illumination is often utilized for dark interiors and also for portraits at night. Pure magnesium or aluminium powder involve no risk of spontaneous ignition; but in the case of some flash mixtures on the market there is grave danger attending their use, and several serious, if not fatal, accidents have occurred. The method of the employment is to blow a small quantity of the powder through the flame of a spirit lamp by means of a small glass tube having a fine orifice. There are several different patterns of flash-lamps on the market.

FLATNESS OF FIELD.—That quality in a lens by which it renders the lines in the centre of the image as well as those at the margin, so that they fulfil the rules of perspective and are sharp and equally well defined. The new anastigmatic lenses have great flatness of field, and this quality makes them desirable for copying architectural or topographical work, but not desirable in pictorial landscape or portraiture.

FOCUS.—The focus or focal length of a lens is the distance from the diaphragm if a compound lens, and from the lens itself, if a single one, to the focussing screen, when an object at a considerable distance is sharp. The longer the focus of a lens, the smaller the angle it includes for the same size of plate. The *actinic focus* of a simple lens does not coincide with its visual focus, but this defect is corrected in all forms of lenses except those known as the "spectacle" class by combining two lenses and bringing the different foci together at a point. For this reason a slight correction must be made when a spectacle lens is used, the front of the camera being drawn a trifle nearer the screen, until the foreground objects are just, and only just, out of visual focus.

FOCUSSING SCREEN.—The ground glass or other substance fitted at the back of the body of the camera to receive the image thrown by the lens. Ground glass can usually be improved by oiling. A makeshift focussing screen can be prepared, in case of breakage, by coating a glass plate with matt varnish.

FORMALIN.—The name given to a saturated solution of formic aldehyde. It is used in place of alum for hardening gelatine films and preventing frilling. One part formalin to nine parts water is the strength of solution usually employed. Negatives and lantern slides immersed in such a solution may be dried before a fire without danger. It is also occasionally used as an accelerator in development.

FRENCH CHALK.—Talc in a finely powdered condition. Used for cleaning glass in connection with the glazing of gelatino-chloride prints, or the double-transfer carbon process.

FRILLING.—During development, fixing, or subsequent washing negatives sometimes show a tendency to pucker and peel off the glass at the edges. Frilling is often produced by the unequal temperature of solutions—a warm hypo bath, for example, and an icy cold washing water—which brings about sudden contraction in the film. Immersion of the plate in methylated spirit will stop frilling, and this can be done during development without ill effect on the negative. If plates frill in the fixing bath or during washing, use formalin.

GLASS.—A combination of silica with alkalies. There are many different kinds of glass—flint glass, crown glass, etc. Lenses are partly made of flint glass and partly of crown glass, in order that they may be achromatic.

HALF-PLATE.—A customary and arbitrary size in photography, measuring 6½ × 4¾. Cameras, plates, papers, etc., are supplied of these dimensions.

HOME-MADE DEVELOPING TRAYS.—Cut out four pieces of wood and nail together to form the sides of tray; also cut a piece of wood to form the bottom, which should not yet be nailed on. Melt together in an iron ladle a mixture of equal parts of gutta-percha, resin and pitch; allow to solidify, and then break up into small pieces. Heat a short length of iron rod in the fire till nearly red hot. The wood is coated by holding it in a horizontal position, placing a few bits of the cement in the centre, and melting by means of the hot iron, which also serves to spread it over the surface and fill up the corners. The bottom having been coated, should now be nailed on, the joint being coated in the same manner as the sides. Give the outside a coat of varnish. Trays made as above are acid-proof, light and practically unbreakable, and the employment of the hot iron renders coating the wood a very easy operation.

ISOCHROMATIC.—This term or its synonym, orthochromatic, is applied to plates so prepared as to give a more correct rendering of colour values than the ordinary plate can accomplish. The ordinary plate reproduces any yellow object as black, and blue ones nearly white. By specially prepared emulsions, or the use of sensitizing dyes, plates may be made properly sensitive to certain colours. Such plates are on the market, and are chiefly useful for photographing flowers and pictures.

LATENT IMAGE.—A plate which has been exposed in the camera, but not developed, is said to hold in the film, although invisible, a latent image. The exact nature of this image has not yet been determined, but the most generally accepted theory is that it consists of a silver sub-bromide, which upon application of the developing agent becomes still further reduced to metallic silver.

LITMUS PAPER.—Prepared paper for testing whether a solution is acid or alkaline. Blue litmus paper turns red if the solution is acid. Red litmus becomes blue when immersed in an alkaline solution.

Matt Surface.—Prints, or for that matter any substances which have not a glazed surface, are said to be matt. An egg-shell has a matt surface; a piece of window glass a glazed surface. Printing papers having a matt surface are preferable for artistic purposes.

Methylated Spirit.—Prepared by adding 10 parts of wood naphtha to 90 parts of rectified spirit. Utilized in photography for drying negatives quickly by immersion in it, whereby the water is absorbed, and the plate dries very rapidly when placed in a rack. Methylated spirit is also employed in the preparation of many varnishes, and as a solvent for cleaning glass plates it has no equal.

Opaline.—Name applied to a photograph mounted by means of hot gelatine in optical contact—face towards a piece of glass.

Ortol.—A comparatively new developing substance of great vigour, and similar in its action to metol, but without the skin action of that substance. The following formula is recommended:—

A.

Ortol	70 grains	or	15 parts.
Potassium metabisulphite	35 ,,	or	7½ ,,
Water to make	10 ozs.	or	1000 ,,

B.

Soda crystals	1 oz.	or	100 ,,
Sodium sulphite	1 ,,	or	100 ,,
Potassium bromide	10 grs.	or	2·3 ,,
Water to make	10 ozs.	or	1000 ,,

These are mixed in equal volume immediately before use.

Paper Negatives.—Paper coated with highly sensitive emulsion can now be obtained from several makers, and used in the camera to take the place of plates or films. It is also very convenient for enlarging purposes. In some cases the film can be stripped and transferred to glass for printing purposes, or, as an alternative, the paper rubbed with vaseline to render it translucent.

Platinum Toning.—Some of the salts of platinum may be used for toning in place of gold. Of these potassium chloroplatinite is the best to employ. Prepare the following bath :—

Potassium chloroplatinite	20 grains.
Citric acid	150 ,,
Water	40 ozs.

For use, take equal parts of the above and water. Printing should not be carried any deeper than it is required to be in the final result. Platinic chloride is sometimes used for toning bromide prints.

Quarter-Plate.—A regular size of camera, meaning one which will take a plate of 4¼ × 3¼.

Rectilinear.—A particular form of lens, consisting essentially of two single lenses combined in order to counteract the errors of distortion produced by single lenses when photographing buildings. A rectilinear lens is often called rapid, but it is not necessarily more rapid than other forms, and the title is a misnomer. The rapidity of a lens depends almost entirely upon the size of its working aperture.

Restrainer.—Any substance added to the developer for retarding the too rapid appearance of the image. Ammonium bromide or potassium bromide is generally employed for the purpose. The former is the more active restrainer. Quantities as follows to make restrainers of equal strength :—

Ammonium bromide	98 grains.
Water	980 minims.

Potassium bromide	119 grains.
Water	980 minims.

Retouching.—The correction of defects in negatives by pencil-work on the negative itself. Mainly applied in portraiture. The negative is first varnished, and then the portion upon which retouching is to be made is dabbed with a wad of cotton wool dipped in retouching medium, which gives a tooth to the pencil. The retoucher then wields the pencil carefully, making dots and lines to remove marks or blemishes on the features

Reversed Negative.—Occasionally in enlarging, and sometimes in carbon printing, a reversed negative is required. There are several ways of obtaining reversed negatives—by reversal in the camera by means of a silvered reflector or a prism, by taking the subject through the back of the plate, or by stripping the film and reversing it.

Reversing Back.—In all stand cameras the back portion, where the dark slide is inserted, should be removable, and capable of being turned either upright or oblong, so as to obtain pictures of either shape.

Rising Front.—In all well-fitted cameras, the front, or the central portion of it holding the lens, can be raised or lowered so as to include more sky and less foreground, or *vice versa.*

Rodinal.—A concentrated solution of paramidophenol, used as a one-solution developer for plates and lantern slides, but especially the latter.

Sensitized Paper.—Any description of paper which has been prepared for the purpose of making photographic prints upon is called sensitized paper, but the term is usually applied to albumenized paper which has been floated upon a bath of silver nitrate.

Sky Shade.—A projecting shade placed over or around a lens to prevent direct light from the sky from entering the lens and diminishing the clearness of the image.

Spectacle Lens.—A single lens uncorrected for achromatism is known by this name. As explained under *Lens*, it is necessary to allow about $\frac{1}{50}$ of the focal length for the correction of this fault, or, in other words, to rack the lens slightly nearer the plate after focussing has been done in the ordinary way. Spectacle lenses are well adapted for landscape photography, because of their property of diffusion of focus. A spectacle glass which can be bought for a few pence can be mounted in a tube and utilized, but spectacle lenses of superior make are now sold in series of four or more of differing focal lengths.

Stereoscopic.—Stereoscopic cameras have twin lenses, separated from each other at such a distance that they give two images, slightly different, just as in the case of the eyes. When stereoscopic positives are viewed through the instrument known as the stereoscope, the two pictures become fused into one, and the eye receives the impression of a picture in strong relief.

Swing Back.—An arrangement whereby the back of the camera can be set at varying angles to the base, in order that it may always be vertical whatever the position of the camera, for the purpose of avoiding distortion.

Transparency.—A positive photograph on glass or some other transparent substance. Lantern slides are, of course, transparencies, but larger positives may be made for window decoration and other purposes. Special plates may be had for the preparation of transparencies, and exposure and development are the same as for lantern slides.

Uranium Nitrate.—This salt is used for one method of intensification, also for toning and for the preparation of a special sensitized paper.

Varnishing.—Negatives to be properly preserved ought to be varnished. For this purpose they should be quite dry and slightly warmed over a gas jet. The varnish is then flowed over the plate and the surplus allowed to fall back into the bottle. After thoroughly draining, hold over flame again and heat well until varnish sets. The following is an excellent recipe for negative varnish :—

Sandarac	4 parts.
Methylated spirit	20 ,,
Chloroform	0·5 ,,
Oil of lavender	3 ,,

Vignette.—A print in which the margins are gradually softened off. This style is chiefly adapted for portraits, and may be arrived at by means of a piece of card placed over the printing frame in which an opening of the desired size has been cut with a serrated edge. Glass vignetters and also those made of waxed paper are upon the market.

PRINTED BY PERCY LUND, HUMPHRIES & CO., LTD.,
THE COUNTRY PRESS, BRADFORD;
AND 3, AMEN CORNER, LONDON, E.C.

Sold by
the Leading Photo Dealers,
Chemists, Newsagents and Bookstalls.

PHOTOGRAPHIC

..CHAT..

FOR AMATEURS.

ONE PENNY MONTHLY.

Subscription: **1s. 6d.** per Annum, post-free.

Published by
The "OPTICIAN & PHOTOGRAPHIC
TRADES REVIEW,"
123, 124 & 125, Fleet Street,
LONDON.

**An
exhaustively illustrated,
popularly written book, dealing
with every form of
CINEMATOGRAPH, BIOGRAPH, Etc.**

Tells "How it is Done."
**"It contains a complete history of the
fascinating Art."**

'LIVING PICTURES'

Price, 2s. 6d. Post-free, 2s 10d.

Published by
The "OPTICIAN & PHOTOGRAPHIC
TRADES REVIEW."
123, 124 & 125, Fleet Street,
LONDON.

THE OLDEST PHOTOGRAPHIC PAPER, yet the Brightest and Most Popular of all : : : : : : : ; : :

The Photographic News

UP-TO-DATE.
CHATTY.
PRACTICAL.
INTERESTING.

Periodical Competitions.
Cash Prize.
Silver and Bronze Medals.

* * *

EVERY FRIDAY, ONE PENNY.

Specimen Copy Post-free on application.

* * *

On Sale of all Newsagents, Bookstalls, etc.,
every Friday, or post-free, 1½d., from

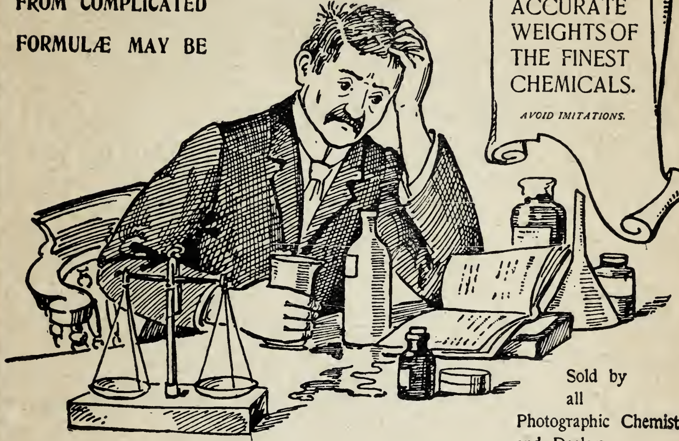
THE PUBLISHER, 9, Cecil Court,
Charing Cross Road, London, W.C.

ALL TROUBLE

OF COMPOUNDING SOLUTIONS
FROM COMPLICATED
FORMULÆ MAY BE

'TABLOID'
PRODUCTS
CONTAIN
DEFINITELY
STATED AND
ACCURATE
WEIGHTS OF
THE FINEST
CHEMICALS.

AVOID IMITATIONS.



Sold by
all
Photographic Chemists
and Dealers.

ENTIRELY AVOIDED BY USING

TRADE MARK 'TABLOID' BRAND PHOTOGRAPHIC
CHEMICALS.

FULL LIST OF DEVELOPERS ETC, ETC,
WITH DIRECTIONS, GRATIS, FROM

BURROUGHS WELLCOME & Co. SNOW HILL BUILDINGS,
LONDON.

COPYRIGHT PHO. 31.

The Actien Gesellschaft für Anilin Fabrikation,

. . . BERLIN. . . .

PHOTOGRAPHIC DEPARTMENT.

TRADE A.G.F.A. MARK.

MANUFACTURERS of..

Patent Developers, Photographic Chemicals and Cartridge Developers.

RODINAL.	The most powerful and simplest developer ever offered. For all sorts of work. Always ready for use.
EIKONOGEN.	A very powerful yet soft working developer; invaluable for snap-shots. Does not produce violent contrasts.
IMOGEN SULPHITE.	Easy to prepare; easy to use; giving perfect results. Requires no addition of costly chemicals.
AGFA INTENSIFIER.	Efficient, simple, always ready. Complete intensification in one manipulation.
AGFA REDUCER.	Only requires dissolving in water to be ready for immediate use.
AGFA VARNISH.	An ideal negative preserver. Can be applied cold or hot. Obviates the use of retouching medium.
AGFA NEUTRAL TONING and FIXING SALT.	A novel preparation for giving a neutral combined bath that does not double tone, does not give sulphur toning, and is easy to use and prepare.

. . . ALSO . . .

METOL AMIDOL ORTOL PARAMIDOPHENOL
GLYCIN DIOGEN DIPHENAL

Ask your Dealer for our Booklet, it contains 40 pages of useful information.

SOLE AGENTS—**CHAS. ZIMMERMANN & Co.,**
9 & 10, St. Mary at Hill, London, E.C.

TO ATTAIN SUCCESS IN **PHOTOGRAPHY**

IT IS NECESSARY TO SELECT A

Good Camera and Shutter,

and Reliable Plates, Films, etc.,

BUT PRACTICALLY

EVERYTHING DEPENDS

upon the intelligent use of **THE LENS** employed, which must be of suitable focus and aperture for the subject to be photographed.

FOR ADAPTATION TO OLD OR NEW CAMERAS.

ROSS, Ltd., ***offer to Amateur or Professional Photographers and Process Workers a Greater Choice and a Finer Selection of High-class Lenses than any other Manufacturer in the World.***

SEND FOR PRICE LIST OF...

ROSS' SYMMETRIC ANASTIGMATS,
ZEISS' NEW PLANAR and UNAR LENSES,
ZEISS' CONVERTIBLE ANASTIGMATS,
GOERZ' DOUBLE ANASTIGMATS, Etc.

The Most Perfect Lenses.
In Light and Elegant English Finish

Sold by Leading Dealers everywhere.

ROSS, Ltd.,
111, New Bond Street, London, W.;
31, Cockspur Street, Charing Cross, S.W.

Sole British Manufacturers of
ZEISS and GOERZ LENSES.

PARIS BRANCH: 35, BOULEVARD DU TEMPLE.
WORKS: CLAPHAM COMMON, S.W.

Awarded the Grand Prix and a Gold Medal, Paris, 1900.

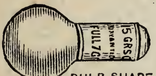
JOHNSON & SONS,

Manufacturing Chemists, Ltd.,

23, Cross St., Finsbury, London, E.C.

Scales Brand Pure Chemicals — TRADE MARK — For Photography.

Johnson's Guaranteed Gold Chloride.



BULB SHAPE.

TRADE MARK

LONG SHAPE.

Purchasers should be careful to see that each tube bears the Scales Trade Mark.

SILVER NITRATE. POTASSIUM CHLOROPLATINITE.
PLATINUM BICHLORIDE. RESUBLIMED PYROGALLIC ACID.
HYDROKINONE. AMMONIUM SULPHOCYANIDE, PURE.
Soda Sulphite Recryst., Pure. Soda Carbonate Recryst., Pure.
Soda Hyposulphite, Pea Cryst. or Granular.

Johnson's Cartridges. DEVELOPING, TONING and FIXING, Etc.

- Amidol
- Eikonogen
- Eikonogen-Quinol
- Hydrokinone
- Metol
- Metol-Quinol

- Ortol-Soda
- Pyro-Metol
- Pyro-Soda
- Toning
- Toning & Fixing
- Fixing and Acid Fixing

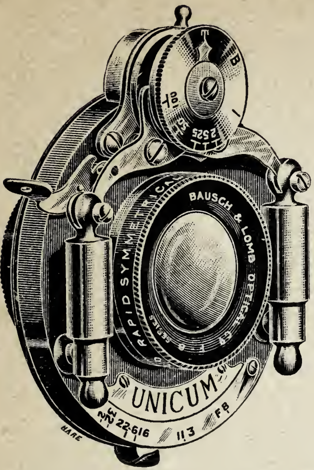
Johnson's Compressed Pyro in 1 oz. Tablets.

Pure, very Soluble, Portable and Convenient.

All Chemicals of the Finest Quality.

Every Camera should be fitted with our Shutter and Lens.

Bausch & Lomb's
NEW
'Unicum' Shutter,



Reconstructed and improved, with ***A. E. Staley & Co.'s Special Rapid Symmetrical Lens,*** *f*/8, 5½ in. equivalent focus.

1000 of these will be ready on January 1st (special prices for quantities for Camera Makers).

Price £1 13 0.

½-plate photos showing covering power and depth of focus forwarded on receipt of stamp. Special prices to trade on production of card. Booklet of Shutters on application. *Write also for Prize Competition particulars.*

The 'Planastigmat,' *f*/6·8, made of Jena Glass. PRICE: 5 in. and 5½ in., **36/0**; 6 in., **40/0**; 7½ in., **50/0;** 9 in., **52/0**; 11 in., **65/0**; with Iris Diaphragm. Specimen photo on receipt of stamp.

'Recticurvate' Lenses, *f*/5·6. 5¾ in., **40/0**; 7¾ in., **60/0**; 11 in., **110/0**; 14½ in., **130/0**; 18 in., **170/0**.

BAUSCH & LOMB'S.

The 'Plastigmat,' the finest of modern anastigmats, *f*/6·8. Built on honour all the way through, and every lens will be found perfect, optically and mechanically. Prices on application.

New "Weno" Film Cameras.

If you want the ***best*** Film Camera, write for "WENO" list. They are daylight loading, have many special improvements, are portable, optically the best, and are the ***only focussing*** day-light loading ***Roll*** Film Cameras on the market. You can focus for ***every*** exposure on a ground-glass screen, as on an ordinary camera. Please write for list "WENO."

A. E. Staley & Co., ***35, Aldermanbury,***
LONDON, E.C.

BERESFORD'S PARAGON CHANGING BAG.

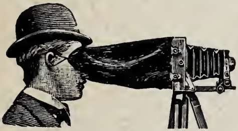
A thoroughly practical and reliable article for changing plates either in dark slides or hand cameras. Has a leather eyepiece fitted with ruby glasses, and a window of ruby medium. Strongly made, very durable, and perfectly safe. Used by all the leading photographers at home and abroad.

Prices—

$\frac{1}{4}$-plate size.... **7/6** $\frac{1}{2}$-plate .... **10/0** $\frac{1}{1}$-plate **12/6**

BERESFORD'S PARAGON FOCUSSER.

Entirely Supersedes the Focussing Cloth.



This appliance forms a dark chamber between the eyes of the operator and the focussing screen, thereby securing a brilliant image and greatly facilitating fine focussing. Fits on the camera by an elastic band; does not blow about; leaves the hands free. Invaluable for ladies; does not ruffle the hair.

Prices—$\frac{1}{4}$-plate size .. **2/6**; $\frac{1}{2}$-plate .. **3/0**; $\frac{1}{1}$-plate .. **4/0**

Illustrated Price List of Changing Bags, Tents, etc., post-free.

F. BERESFORD, 14, BRIDGE ROAD WEST,
BATTERSEA, LONDON, S.W.

AXE BRAND

TRADE MARK
WR
FB

PHOTOGRAPHIC CHEMICALS, P.O.P. AND BROMIDE PAPERS.

PYRAXE.—Purest Pyrogallic Acid, in crystal form. **10d.** per Oz.

FLASHAXE.—Smokeless Candle Flashlights, in sizes, 2, 4, 7, 12 and 20 seconds.

GOLDAXE.—A Neutral Gold Toning and Fixing Salt, in tins, **1/-** each.

SOLARAXE.—Backing Solution for Plates, per Bottle, **1/-.**

ASK FOR HAUFF'S DEVELOPERS:

Adurol, Metol, Amidol, Ortol, etc.

Sole Agents:

FUERST BROS., 17, PHILPOT LANE,
LONDON, E.C.

DALLMEYER FOR LENSES.

STIGMATIC LENSES, Series I. f/4.

STIGMATIC LENSES,
Series II. f/6, 3 foci.

STIGMATIC LENSES,
Series III. f/7·5.

PORTRAIT LENSES,
f/2·2, f/3·16, f/4, f/6.

TELEPHOTO LENSES.

RAPID RECTILINEARS.

WIDE-ANGLE LENSES.

CINEMATOGRAPH LENSES.

TELESCOPES,
Etc.

SEND FOR CATALOGUE.

J. H. DALLMEYER, LTD.,
25, NEWMAN STREET, LONDON, W.

STUDIO AND FIELD CAMERAS
IN ALL PATTERNS.
Speciality in
BRASS-BOUND WORK
for Tropical Use.

NEW
LONG FOCUS CAMERA.

The
DALLMEYER HAND CAMERA
(Long Extension).

The
"POPULAR" HAND CAMERA.

DALLMEYER'S
NEW NATURALIST CAMERA,
with Telephoto Lens and Mirror Focussing.

ESTIMATES AND ADVICE FREE.
SPECIAL ATTENTION TO FOREIGN AND COLONIAL ORDERS.

Five per Cent. Discount for Cash with Order.

Optical Manufactory: **25, NEWMAN ST., LONDON, W.**

“The King of Self-Toning Papers.”

Mallandain’s “V.B.” Self-Toning

P.O.P. MATT. only.

The simplest to print and the Best Self-Toned Paper on the Market, producing a beautiful picture in rich brown.

The print only requires washing in water and fixing in a weak solution of hypo to make it permanent.

	Size	Price
24 Sheets in each packet.	2½ × 2½	**6d. per packet.**
	3½ × 2½	
	3½ × 3½	
	¼-plate	
	5 × 4	**1/- per packet.**
	6 × 4¼	
	½-plate	
12 Sheets	1/1-plate	
8 Sheets	10 × 8	

Full Instructions enclosed in each packet.

“V.B.” Sensitized Post Cards.

10 Cards in each packet, **6d. per packet.**

These Post Cards are cut to regulation size, are Sensitized on one side and printed on the reverse.

“V.B.” Masks and Discs, for using with the above, **6d. per packet.** 12 each Masks and Discs in each Packet. Size 4¾ × 6½.

Postage 1d. extra.

“V.B.” Paper in Tubes.

Size	Sheets	Price
12 × 10	6 sheets	**Per tube. 1/-**
12½ × 10½	5 ,,	
15 × 12	4 ,,	
17 × 23	2 ,,	

“V.B.” Paper in Rolls.

Per roll, 12 ft. × 20 in., **4/6** each. Per roll, 25 ft. × 20 in., **9/-** each.

“V.B.” Sensitized Canvas.

Size in Tubes	Sheets	Price
12 × 10	3 sheets	**Per tube. 1/6**
15 × 12	2 ,,	
15 × 30	1 sheet	

Thick Rough Sensitized Paper can be supplied in tubes for Colouring Prints in Water Colours at double the prices quoted above for Paper.

Postage 2d. extra.

The above can be obtained from any dealer or direct from the Maker—

ALBERT E. MALLANDAIN, 51, CHEAPSIDE,
. . LONDON, E.C.

CADETT

BEST ONLY.

THE

ROYAL

Plate for Amateurs

❧

In following Sizes only:—

	3¼ × 3¼	4¼ × 3¼	5 × 4	6½ × 4¾	9 × 12 cm.
Per doz.	**1/0**	**1/0**	**1/7**	**2/3**	**1/3**

THIN GLASS. Usual Mode of Packing and Boxing.

Speed No. 100°, with Pyro-Soda, etc. With this Plate for correct exposures without calculations, use the (**Dibdin's**) **Exposure Meter, 6d.** (Post-free, **7d.**)

OF ALL DEALERS.

CADETT & NEALL, Ltd., Ashtead,
SURREY.

Manufacturers of Printing-Out and Bromide Papers.

SATISFACTION GUARANTEED

OR MONEY RETURNED.

EXTENDED PAYMENTS. NO SURETIES.

EVERYTHING OPTICAL OR PHOTOGRAPHIC.

LESS THAN STORE PRICES.

ALBERT T. HARRIS,

136, HERNE HILL, S.E.

Telephone: Box 67, Hop.
Telegrams: Harris, Optician, Herne Hill.

THE MAGAZINE OF PRACTICAL PHOTOGRAPHY.

By its clear and practical help to the beginner and advanced worker, by the readiness with which it has placed its readers in touch with every new movement, and by the excellence of its illustration and printing, **The Photogram** has made and sustained its place at the head of photographic periodicals.

INTELLIGENTLY DIFFERENT
FROM THE OTHERS - - - -

Threepence, on the 25th of every month, from photographic dealers or newsagents; 5/- per annum, post-free to any part of the world, from the publishers.

DAWBARN & WARD, Ltd.,
6, Farringdon Avenue,
London, E.C.

USE HIGGINS'

HIGGINS' Photo-Mounter
CHAS. M. HIGGINS & CO. MANUFACTURERS
HIGGINS' Photo-Mou
A NOVEL AND SUPERIOR ADHESIVE FOR MOUNTING PHOTOGRAPHS AND SCRAP PICTURES
Photograph
Warranted to keep good
to contain nothing injurious
If too thick stir
fluid If still too thick
Keep jar covered

PHOTO-MOUNTER.

A Chemically Pure Adhesive

GUARANTEED

Not to Cause

FADING or DISCOLORATION.

This ideal preparation is employed by all the leading Photographers, both Amateur and Professional, all over the world.

OF ALL PHOTOGRAPHIC DEALERS.

Do not be Misled and take "Something just as Good." You cannot get

BETTER THAN THE BEST.

HIGGINS'

Waterproof Drawing Ink

Absolutely Black.

(Invaluable for Reproductive Work).

Also in these COLOURS—

Carmine, Green, Scarlet, Blue, Vermilion,
Indigo, Yellow, Brown, Brick Red,
Orange and Violet.

CHAS. M. HIGGINS & Co., 106, Charing Cross Rd.,
LONDON, W.C.

The 'Sunny Memories' Album

5/- Series.

No. 1. To take photographs up to ½-plate. Capacity about **150** prints.

No. 2. To take photographs up to 5×4. Capacity about **130** prints.

Nos. 1 and 2. Unless otherwise ordered, supplied bound in Red Art Canvas.

No. 3. To take photographs up to ¼-pt. Capacity about **175** prints.

No. 3. Unless otherwise ordered, supplied bound in Blue Art Canvas.

No. 4. To take oblong photographs up to 6⅝×2⅛. Capacity about **135** prints.

No. 4. Unless otherwise ordered, supplied bound in Green Art Canvas.

No. 5. To take photographs up to 3½×3½. Capacity about **140** prints.

No. 4. Unless otherwise ordered supplied in Terra Cotta Art Canvas.

Special Albums. Size and style as above series, but with openings cut to customer's own sizes - - - - - - - - - - - - - - Price **7/6**

X Album. The "Sunny Memories" Album. Special Presentation Edition. Handsomely bound in full morocco with real gold ornamentation, lettering and edges, **21/-.**

3/- Series.

Suitable for the productions of the hand camera.
Bound in cloth.

No. 20. To take photographs up to 3×3. Capacity about **100** prints.

No. 21. To take photographs up to ¼-plate. Capacity about **96** prints.

No. 22. To take oblong photographs up to 6⅝×2⅛. Capacity about **72** prints.

No. 23. To take photographs up to 4¼×2½. Capacity about **96** prints.

Nos. 20, 21, 22, 23. Unless otherwise ordered are supplied in Natural Coloured Canvas.

Special Albums. Size and style as above series but with openings cut to customer's own sizes - - - - - - - - - - - - - - Price **4/6**

Nos. 20X, 21X, 22X, 23X. The "Sunny Memories" Album. Special Presentation Edition. Handsomely bound in full morocco with real gold ornamentation, lettering and edges - - - - - - - - - - - - Price **12/6**

2/6 Series.

To hold photographs taken by smaller cameras than ¼-plate.

No. 30. To take photographs up to 3×2¼. Capacity about **100** prints.

No. 31. To take photographs up to about 2×1¼. Capacity about **175** prints.

No. 32. To take photographs up to 2¼×2¼. Capacity about **120** prints.

Nos. 30, 31, 32. Bound in Red, Green or Blue Art Canvas.

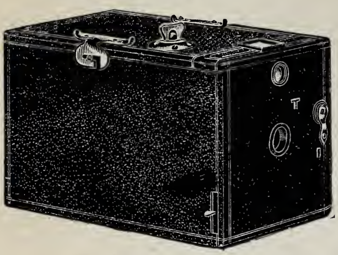
Nos. 30X, 31X, 32X. The "Sunny Memories" Album. Special Presentation Edition. Handsomely bound in full morocco with real gold ornamentation, lettering and edges - - - - - - - - - - - - Price **10/-**

Of all Dealers, or direct from
PERCY LUND, HUMPHRIES & Co., Ltd., The Country Press, Bradford;
and 3, Amen Corner, London, E.C.

"PRIMUS" Roll Film Cameras.

No. 1 Maxim.

Daylight Spools. **Pictures 2¼ × 2¼.**



Specification.

Body substantially made in **wood.**

Covered in morocco leatherette.

Fittings handsomely nickel-plated.

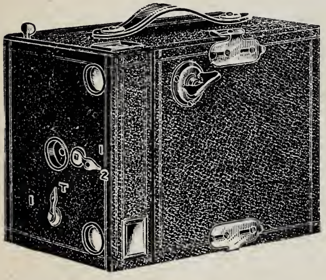
Finder, ground-glass pattern.

Shutter, giving time and instantaneous exposures.

Price, with View Finder— 5/- Complete in Box, with Book of Instructions.

No. 2 Maxim.

Daylight Spools. **Pictures 3¼ × 2¼.**



Specification.

Body substantially made in **wood.**

Covered in morocco leatherette.

Fittings handsomely nickel-plated.

Finders, Two Brilliant, for horizontal and vertical views.

Shutter giving time and instantaneous exposures.

Diaphragms adjustable by nickel lever, *f*/11 and *f*/16.

Handle, black solid leather for carrying.

Price, with Brilliant View Finders 10/- Complete in Box, with Book of Instructions.

To be obtained of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

"PRIMUS" Roll Film Cameras.

No. 3 Maxim.

Daylight Spools. **Pictures $4\frac{1}{4} \times 3\frac{1}{4}$.**

Specification.

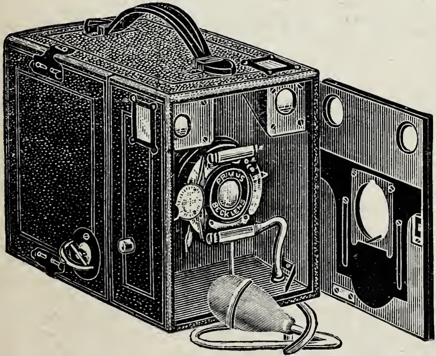
Body substantially made in **wood.**
Covered in morocco leatherette.
Fittings handsomely nickel-plated.
Finders, Two Brilliant, for horizontal and vertical pictures.
Shutter giving time and instantaneous exposures.
Diaphragms, revolving *f*/8, *f*/11, *f*/22.
Handle, black solid leather, for carrying.

Price, with
Brilliant View Finders: **£1 1s.**

complete in box, with book
of instructions.

No. 5 Maxim.

Daylight Spools.
Pictures $4\frac{1}{4} \times 3\frac{1}{4}$.



Specification.

Body is made in mahogany throughout and polished inside the front.
Covered in handsome morocco leatherette.
Lens is a **Primus-Beck** Rapid Rectilinear specially manufactured by R. & J. Beck.
Shutter is a Bausch & Lomb Unicum with pneumatic release.
Finders are extra large Brilliant pattern.

Price: £3 3s.

in cardboard box, with
book of instructions.

Fitted with a PRIMUS-BECK R.R. LENS.

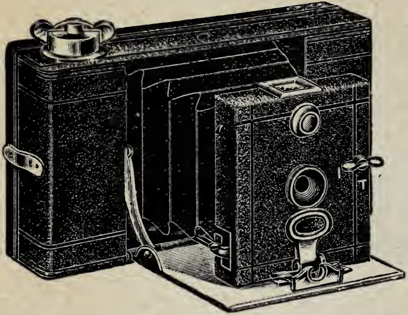
To be had of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

"PRIMUS" Roll Film Cameras.

No. 1 Folding Nipper.

Daylight Spools. **Pictures $2\frac{1}{4} \times 2\frac{1}{4}$**



Specification.

Body made in metal throughout and covered in handsome morocco-grained leatherette.
Lens single view.
Finder of ground-glass pattern.
Shutter Time & Instantaneous.
Bellows of handsome red leather

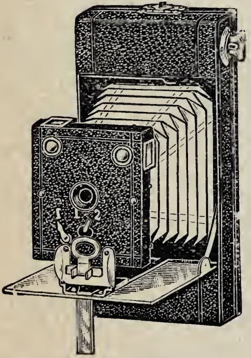
Price

10/6

Complete in box with book of instructions.

Nos. 2 & 3 Pom-Pom.

Daylight Spools.



Specification.

Body made in metal throughout, covered in handsome morocco-grained leatherette.

Lens, best quality single achromatic with diaphragms.

Shutter for Time and Instantaneous exposures, F/11 and F/16

Finders for horizontal and vertical pictures.

Bellows are of handsome red leather.

Prices.

No. 2—$3\frac{1}{4} \times 2\frac{1}{4}$…………	**£1**	**2**	**6**
No. 3—$4\frac{1}{4} \times 3\frac{1}{4}$…………	**£1**	**10**	**0**

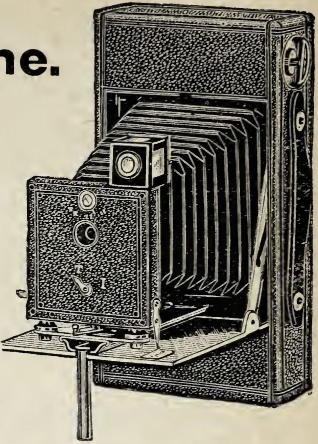
To be had of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

"PRIMUS" Roll Film Cameras.

No. 2 Carbine.

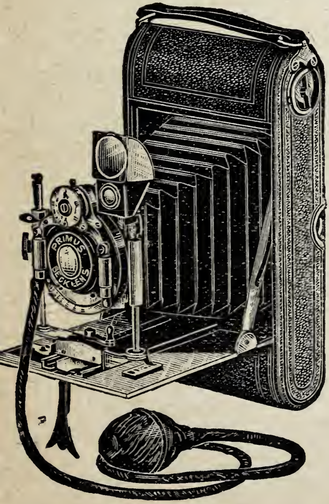
Daylight Spools.
Pictures 4¼ × 3¼.



Specification.

Body well made in wood and covered in morocco leatherette. Polished aluminium base-board.
Fittings all handsomely nickel-plated.
Lens, rapid single achromatic.
Diaphragms, revolving *f*/11, *f*/22, *f*/42.
Finder automatically adjusted for horizontal and vertical pictures.
Shutter giving time and instantaneous exposures.

PRICE £2 2 0.



No. 4 Carbine.

¼-plate.

Patent Spool Holders and Infinity Catch.

£3 12 6.

Fitted with Goerz Lens, Series III.

£8 12 6.

Specification.

Camera very substantially made, to stand hard wear, in well-seasoned walnut, polished inside, and covered with best morocco leatherette. Leather bellows, aluminium base-board, sewn leather carrying handle, new patent spool holders.
Lens is a **Primus-Beck** Rapid Rectilinear, specially manufactured by R. & J. Beck, and guaranteed.
Shutter is the well-known Bausch and Lomb Unicum model.
Finder, reversible for horizontal and vertical pictures, is of best brilliant form.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

"PRIMUS" Roll Film Cameras.

WAVERLEY

Daylight Cartridges

(CELLULOID).

For Daylight Loading and Daylight Unloading.

These films are of the finest possible quality and of extreme rapidity, the black paper backing is absolutely pure, and the numbers printed in solid white are very distinct in the camera.

They are wound on perfect spools with brass ends, and will fit any camera taking the standard sizes.

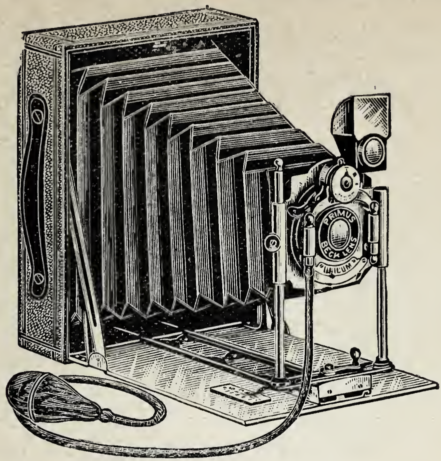
No.	Size		Exposures	s.	d.
No. 1	2¼ × 2¼	..	6 exposures	**0**	**7**
,, 2	2¼ × 2¼	..	12 ,,	**1**	**0**
,, 3	2¼ × 3¼	..	6 ,,	**0**	**10**
,, 4	2¼ × 3¼	F.P.	6 ,,	**0**	**11**
,, 5	2¼ × 3¼	..	12 ,,	**1**	**6**
,, 6	2¼ × 3¼	F.P.	12 ,,	**1**	**9**
,, 7	3¼ × 4¼	..	6 ,,	**1**	**6**
,, 8	3¼ × 4¼	..	12 ,,	**3**	**0**
,, 9	4 × 5	..	12 ,,	**3**	**9**

To be had of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

CAMEO Pocket Cameras.

Very compact, to fit jacket pocket.



Take plates in very thin metal slides.

No. 1. The BABY Cameo. Takes plates $3\frac{1}{2} \times 2\frac{1}{2}$.

Covered in handsome leatherette.
Single view lens.
Time and instantaneous shutter.
Horizontal and vertical view finder.
Two single metal dark slides.
Handsome leather bellows and nickelled parts.

PRICE **15/-**
with Two
DARK SLIDES.

No. 2. The CAMEO. Takes pictures $4\frac{1}{4} \times 3\frac{1}{4}$.

Measurements of camera, $5\frac{1}{2} \times 4 \times 1\frac{3}{8}$. Weight of camera, $11\frac{1}{2}$ oz.
Covered in handsome leatherette.
Single achromatic lens with revolving diaphragms, *f*/11, *f*/22, *f*/44.
Removable ground-glass focussing screen.
Everset shutter, released by the hand or pneumatic ball and tube, giving time, bulb and instantaneous exposures.
Horizontal and vertical view finder. Two single metal dark slides.
Screw and bushes for fixing to tripod.

PRICE **25/-**
Complete in
Cardboard Box
with Book of
Instructions.

No. 3. The R.R. CAMEO. Size of picture, $4\frac{1}{4} \times 3\frac{1}{4}$.

Fitted with a PRIMUS-BECK Lens.

See Illustration above.
Covered in handsome morocco leatherette.
Primus-Beck R.R. Lens, specially manufactured by R. & J. Beck.
Removable ground-glass focussing screen.
Bausch & Lomb Unicum shutter.
Horizontal and vertical **best brilliant** view finders.
Two single metal dark slides.
Screws and bushes for fixing to tripod.

PRICE
£2 10 0
Complete in
Cardboard Box
with Book of
Instructions.

No. 4. The R.R. CAMEO. Half-plate.

Fitted with PRIMUS-BECK Lens, as above. Price **£3 10 0**

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

CAMERAS FOR

Takes 6 Plates or 12 Cut Films, $3\frac{1}{2} \times 2\frac{1}{2}$

PRICE

4/-

Complete in Box with Book of Instructions.

Takes 12 Plates or 24 Cut Films, $4\frac{1}{4} \times 3\frac{1}{4}$

PRICE

7/6

Complete in Box with Book of Instructions.

The advent of this Camera makes a new record in camera production.

To be had of all Dealers.

W. BUTCHER & SONS,

And Blackheath,

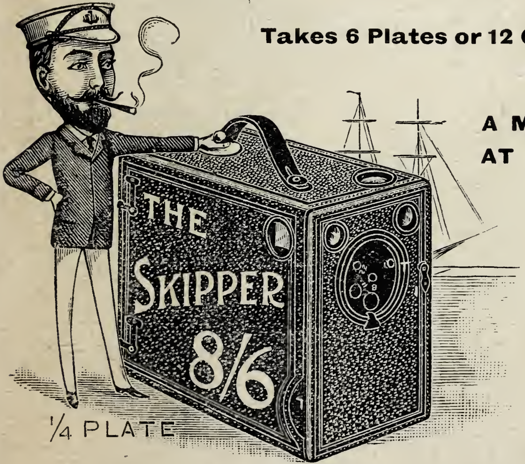
BEGINNERS.

Takes 6 Plates or 12 Cut Films, 4¼ × 3¼ ins.
The Cheapest Practical ¼-plate Camera ever made.

PRICE

5/6

Complete in
Box with Book
of Instructions.



Takes 6 Plates or 12 Cut Films,
4¼ × 3¼ ins.

A MARVEL
AT THE PRICE.

PRICE

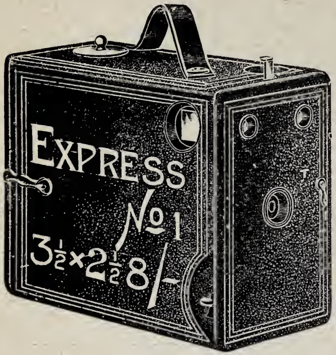
8/6

Complete in
Cardboard Box
with Book
of Instructions.

To be had of all Dealers.

CAMERA HOUSE, ST. BRIDE STREET, E.C.
London, S.E.

EXPRESS
CAMERAS.



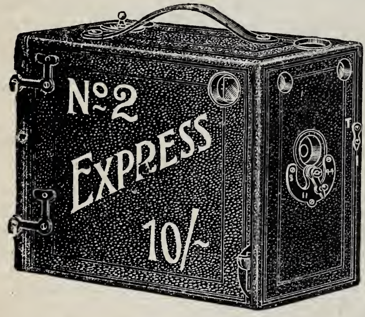
Takes 6 Plates or 12 Films, 3½ × 2½

1903 Improvement.

Exposed Plate Indicator.

Covered in handsome imitation black leather.
Good quality achromatic view lens.
Time and instantaneous shutter with time catch.
Indicator for number of plates exposed.
First quality horizontal and vertical view finders.
Infallible changing system.
Sunk shutter release.
Solid leather handle.

Price .. 8/0 **Complete with Book of Instructions.**



Takes 6 Plates or 12 Films, 4¼ × 3¼

With Revolving Stops and Plate Indicator.

Covered in handsome imitation black leather.
Good quality achromatic view lens.
Adjustable revolving diaphragms, *f*/8, *f*/11, *f*/22 and *f*/44.
Time and instantaneous shutter with time catch.
Indicator for number of plates exposed.
First quality ground-glass view finders.
Infallible changing system.
Sunk shutter release.
Solid leather handle.
Bushes for tripod screw.

Price .. 10/0 **Complete with Book of Instructions.**

TO BE HAD OF ALL DEALERS.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

EXPRESS
CAMERAS.

Takes 12 Plates or 24 Films, $4\frac{1}{4} \times 3\frac{1}{4}$ ins.

Shutter has Adjustable Speeds.

Covered in handsome imitation black leather.
Good quality achromatic view lens.
Revolving diaphragms, *f*/8, *f*/11, *f*/22, *f*/44.
Time and instantaneous shutter with time catch.
Adjustable speeds, 1 sec., $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{25}$, $\frac{1}{50}$.
First quality ground-glass finders.
Infallible changing system.
Solid leather handle.
Bushes for tripod screw.

Price 16/- Complete in Box with Book of Instructions.

Takes 12 Plates or 24 Films, $4\frac{1}{4} \times 3\frac{1}{4}$ ins.

With Magnifiers and Spirit Levels.

Covered in handsome imitation black leather.
Good quality achromatic view lens.
Revolving diaphragms, *f*/8, *f*/11, *f*/22, *f*/44.
Magnifiers for objects at 4, 8, and 12 feet distance.
Time and instantaneous shutter with time catch.
Speed adjustments for 1 sec., $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{25}$, $\frac{1}{50}$.
First quality ground-glass finders, with metal covers.
Infallible changing system.
Sold leather handle.
Bushes for tripod screw.

Price 21/- Complete in Box with Book of Instructions.

To be had of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

"MIDG" Cameras.

No. 0.—Takes 12 $\frac{1}{4}$-plates or 24 films.

1903 MODEL.

21/-

Positively the Best Guinea Camera ever offered.

Specification.

Lens is large diameter, single achromatic, good quality.
Shutter gives both time, bulb and instantaneous exposures.
Speeds are marked approximately $\frac{1}{100}$, $\frac{1}{50}$, $\frac{1}{25}$, $\frac{1}{10}$, $\frac{1}{2}$ and 1 second.
Diaphragms are *f*/8, *f*/11, *f*/22 and *f*/32, adjustable iris movement.
Finders are the finest pattern brilliant.
Sheaths are very easily loaded with plates or films.
Recorder gives number of plates exposed up to 24.
Covering is handsome morocco-grained leatherette.
Screw is supplied for fixing to tripod.

No. 00.—Takes 12 $\frac{1}{4}$-plates or 24 films.

Similar Camera to above, but fitted with **Magnifiers** for photographing objects at 4, 8 and 12 feet distance.

Price 25/- with Book of Instructions.

No. 000.

Exactly the same camera as the **No. 00 Midg**, but made to take 5 × 4 **plates and films.**

Price 32/6 with Book of Instructions.

To be had of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

"MIDG" Cameras.

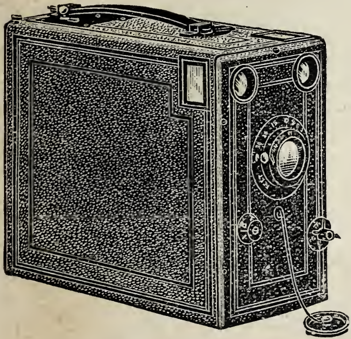
No. 1A

Takes 12 ¼-plates or 24 Films.

Specification.

Rectilinear Lens with two stops.
Focussing for near objects.
Improved Time and Instantaneous Shutter.
Best quality Brilliant View Finders.
Infallible changing system.
Indicator showing number of plates exposed.
Bushes for fixing tripod.
Very handsome morocco-grained cover.
Dust cover to protect the lens.

Price 31/6 **Complete in Box with Book of Instructions.**



No. 1

Specification.

Rectilinear Lens with Iris diaphragm.
Focussing jacket for objects to 6 feet.
Improved Time and Instantaneous shutter with speed adjustments.
Best quality brilliant View Finders.
Indicator showing number of plates exposed.
Screw and bushes for fixing to tripod.
Very handsome morocco-grained cover.

Price 42/- **Complete in Box with Book of Instructions.**

To be had of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

NO. 2 "MIDG" CAMERA.

Fitted with a PRIMUS-BECK Lens.

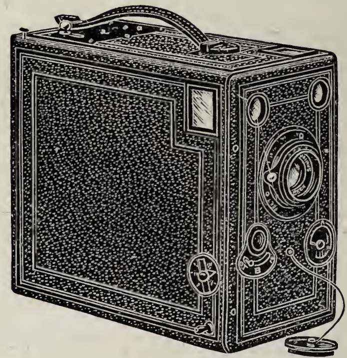
MARVELLOUS VALUE.

Takes 12 Quarter-Plates or 24 Films.

50/-

WITH

PRIMUS-BECK LENS.



50/-

WITH

PRIMUS-BECK LENS.

This Instrument is the best value ever offered, being fitted with an R.R. Lens, made by one of the best English makers.

Specification.

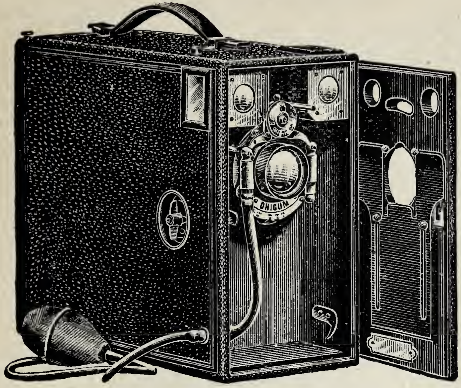
Special quality lens, manufactured by R. & J. Beck.
Focussing jacket for objects beyond 4 feet.
A new improved shutter, giving instantaneous exposures from 1 second to 1/100th of a second; also time exposures.
The shutter can be released by a knob or pneumatic release, ball and tube supplied.
There is also an indicator for showing number of plates exposed.
Two brilliant view finders and bushes and screw for tripod.
The body of camera is very handsomely covered.

To be had of all Dealers.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

"MIDG" Cameras

With PRIMUS-BECK R.R. LENSES.



No. 3

Takes 12 Plates or 24 Films, $4\frac{1}{4} \times 3\frac{1}{4}$ ins.

Bausch & Lomb Unicum Shutter.

Specification.

Lens is a PRIMUS-BECK R.R., specially manufactured by R. & J. Beck.
Diaphragm is iris pattern, *f*/8, *f*/11, *f*/16, *f*/22, *f*/32, *f*/64
Focussing is by scale from outside to objects at 6 feet.
Shutter is the Bausch & Lomb Unicum Model.
Release is either by the finger or by pneumatic ball and tube.
Speeds are for long time exposure, bulb, or 1 second, $\frac{1}{2}$, $\frac{1}{5}$, $\frac{1}{25}$, $\frac{1}{100}$
Finders are of the best brilliant pattern.
Recorder shows the number of plates exposed up to 24.
Covering is handsome morocco-grained leatherette.
Cover is provided for keeping dust from lens and finders.
Screw is supplied for fixing to tripod.

Fitted with PRIMUS-BECK R.R. LENS	**£3**	**3**	**0**
If fitted with Goerz Series III. Double Anastigmat Lens	**8**	**0**	**0**

No. 4

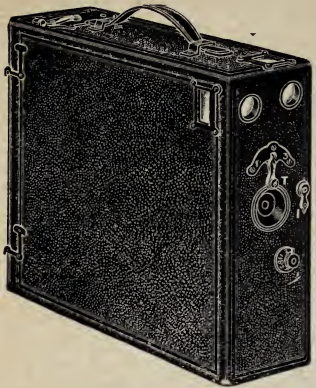
This Camera is the same as the No. 3 'Midg' with the following additions:

Body is made throughout of well-selected mahogany and is highly polished.
Covering is of the best real morocco leather.
Shutter is the Bausch & Lomb AUTOMAT.
Changing System is a most reliable type, enabling sheaths to be inserted or withdrawn easily.

Fitted with PRIMUS-BECK R.R. LENS	**£4**	**4**	**0**
Fitted with Goerz Series III. Double Anastigmat Lens	**9**	**0**	**0**

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

Panoramic "MIDG" CAMERAS.



Takes 12 Plates $6\frac{1}{2} \times 2\frac{3}{8}$ ins.

No. 1.

Large diameter best single achromatic view lens.
Time and instantaneous shutter with speed adjustments.
Catch for long time exposures.
Best quality brilliant view finders.
Improved infallible changing system.
Recorder for number of plates exposed.
Covered in handsome morocco-grained leatherette.
Screw and bushes for fixing to tripod.

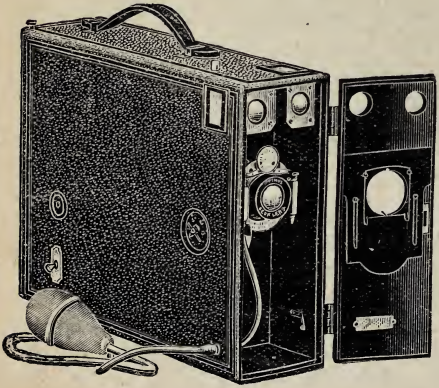
Price 30/-

Complete in Cardboard Box with Book of Instructions.

No. 2.

Fitted with Primus-Beck R.R. Lens and Bausch & Lomb Unicum Shutter.

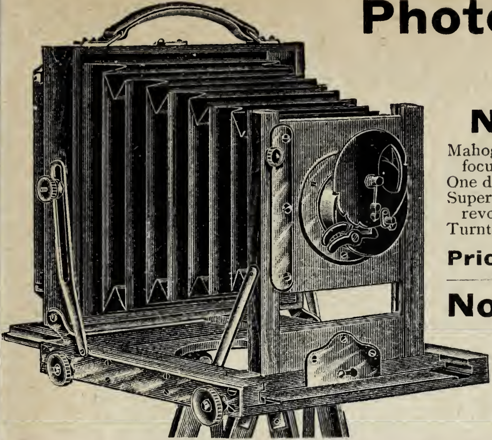
70/-



Lens is a PRIMUS-BECK R.R., specially manufactured by R. and J. Beck.
Diaphragm is iris pattern, *f*/8, *f*/11, *f*/16, *f*/22, *f*/32, *f*/64.
Focussing is by scale from outside to objects at 6 feet.
Shutter is the Bausch & Lomb Unicum model.
Release is either by the finger or by pneumatic ball and tube.
Speeds are for long time exposure, bulb or 1 sec., $\frac{1}{2}, \frac{1}{5}, \frac{1}{25}, \frac{1}{100}$.
Finders are of the best brilliant pattern.
Recorder shows the number of plates exposed up to 24.
Covering is handsome morocco-grained leatherette.
Cover is provided for keeping dust from lens and finders.
Screw is supplied for fixing to tripod.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

Photographic Outfits.



No. 2. ¼-plate.

Mahogany polished camera with rack focussing back and front.
One double dark slide.
Superior single achromatic lens with revolving metal shutter.
Turntable and 2-fold stand.

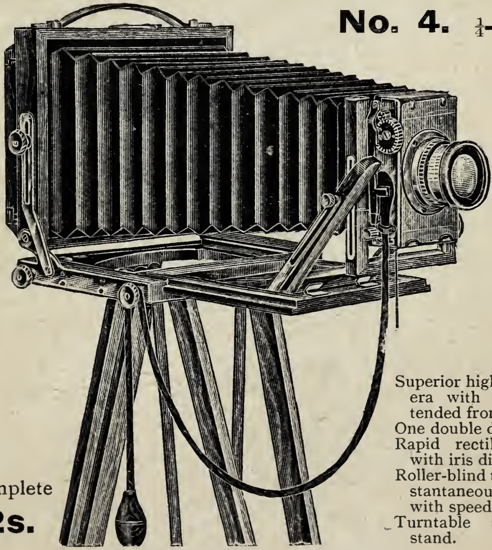
Price complete **£1 1s.**

No. 2a. ¼-plate.

Similar camera to above, but made in walnut wood with nickel fittings.

Price complete **£1 5s,**

No. 4. ¼-plate.



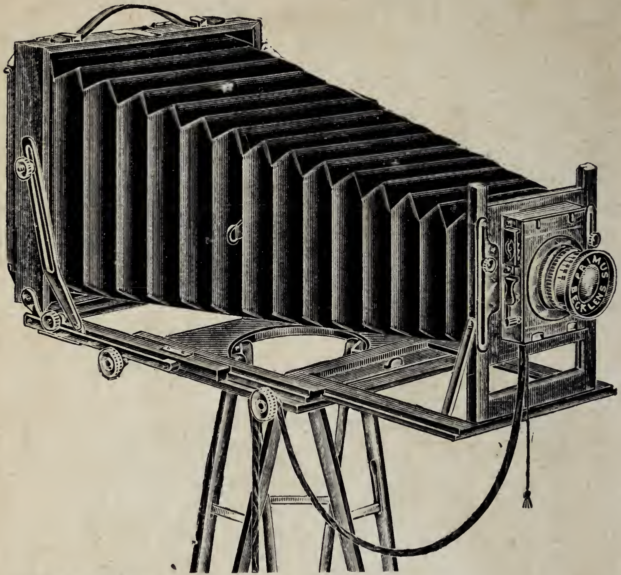
Superior high-class camera with double extended front.
One double dark slide.
Rapid rectilinear lens with iris diaphragm.
Roller-blind time and instantaneous shutter with speed indicator.
Turntable and 2-fold stand.

Price complete **£2 2s.**

TO BE HAD OF ALL DEALERS.

W. Butcher & Sons, Camera House, St. Bride St., E.C.
and Blackheath, London, S.E.

No. 4
PHOTOGRAPHIC OUTFIT.



COMPLETE HALF-PLATE OUTFIT

70/-

1/1-plate Outfit,
£5 10 0

¼-plate Outfit.
£2 10 0

Triple Extension—½-plate Camera, mahogany polished, very superior, rack adjustment, back and front.

Roller Blind Shutter, T. and I. with speed indicator.

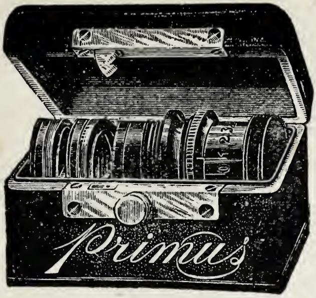
Double Dark Slide, double rabbeted and hinged division.

Turntable fitted to base and best quality **Three-fold Rule Joint Tripod.**

PRIMUS-BECK R.R. Lens, specially manufactured by R. & J. Beck, Ltd.

TO BE HAD OF ALL DEALERS.

W. Butcher & Sons, Camera House, St. Bride St., S.E.
and Blackheath, London, S.E.



"Primus" Casket Lenses.

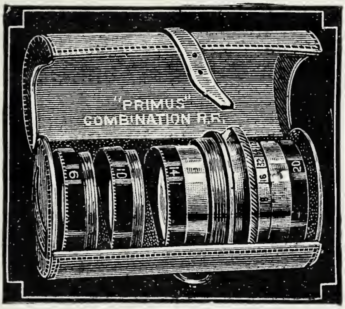
No. 1 Casket Set.

A Complete Set of Meniscus Lenses, producing all foci from 4 to 20 inches, forming 16 different combinations.

Price, £1 5 0.

No. 2 Casket Set.

◆



A Complete Set of Achromatic R. R. Lenses, producing all foci from 4 to 20 inches, forming 16 different combinations.

◆

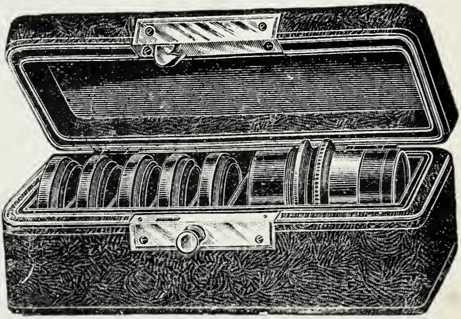
Price, £2 0 0.

No. 3 Casket Set.

Similar to No. 1, but producing all foci from 5 to 34 inches, forming 29 different combinations.

◆

Price, £2 5 0.



No. 4 Casket Set.

Similar to No. 2, and doing all that No. 3 will do. **Price, £3 3 0.**

These Lenses can be had of all Dealers.

W. BUTCHER & SONS, Camera House, St. Bride St., London.

FILMS
R
PLATES
FRENA

Absolutely Unique.

For the Beginner or the Expert.

PRICE—
(with Handbook, 50 pages), **£1 - 1 - 0**

Takes 40 Flat Films Like a Pack of Cards,
Or Glass Plates in Sheaths.
Perfectly Adjustable Shutter, $\frac{1}{10}$ to $\frac{1}{80}$ and Time.
It has a Magnificent Lens, U.S. 8.
It has a Complete Set of Diaphragms.
Two "Cornex" Brilliant View Finders.
Note its Lens Aperture and Shutter Speeds
for a Guinea Camera.
It costs, with Handbook, 60 pages, which
Is a real Guide to Photography, only

£1 1s. 0d.

One Customer writes:— "*I shall recommend it to all I can as being worth above a 'guinea a box.'*"—BLACKPOOL.

WRITE FOR LIST AND SAMPLE PRINT TO BELOW.

Write for the following—
BECK-STEINHEIL LENSES (f/6·3). **The finest moden Anastigmat.**
THE NEW FRENA CATALOGUE.
"PRACTICAL NOTES ON TELEPHOTOGRAPHY." (60 pages).

R. & J. BECK, Ltd., 68, Cornhill, London, E.C

The OLDEST and MOST INFLUENTIAL PHOTOGRAPHIC JOURNAL in the WORLD

urnal of Photography

ESTABLISHED 1854.

Published Every Friday, Price 2d.

Free Specimen Copy upon receipt of

Scale of Charges for Advertisements on Application.

HENRY GREENWOOD and Co.,
PUBLISHERS,
Wellington Street, Strand,
LONDON.

Special
91-B
6813
THE GETTY CENTER
LIBRARY
740
ORC

The Country Press
Percy Lund
Humphries
& Co Ltd

Absolutely Unique.

FILMS OR PLATES
FRENA

For the Beginner or the Expert.

PRICE—
(with Handbook, 50 pages), **£1 - 1 - 0**

Takes 40 Flat Films Like a Pack of Cards,
Or Glass Plates in Sheaths.
Perfectly Adjustable Shutter, $\frac{1}{10}$ to $\frac{1}{80}$ and Time.
It has a Magnificent Lens, U.S. 8.
It has a Complete Set of Diaphragms
Two "Cornex" Brilliant View Finder
Note its Lens Aperture and Shutter S
for a Guinea Camera.
It costs, with Handbook, 60 pages, wh
Is a real Guide to Photography, only

£1 1s.

One Customer writes :— "*I shall recommend it to all I can as above a 'guinea a box.'*"—Blackpool.

WRITE FOR LIST AND SAMPLE PRINT TO BE

Write for the following—
BECK-STEINHEIL LENSES (f/6·3). The finest moden A
THE NEW FRENA CATALOGUE.
"PRACTICAL NOTES ON TELEPHOTOGRAPHY." (60

R. & J. BECK, Ltd., 68, Cornhill, London, E.C

British Journal of Photography

The OLDEST and MOST INFLUENTIAL PHOTOGRAPHIC JOURNAL in the WORLD

ESTABLISHED 1854.

**Published . . .
Every Friday,
Price 2d. . . .**

*Free Specimen
Copy upon
receipt of
Post
Card.*

**. Scale of .
Charges for
. Advertisements . .
. . . on . . .
Application.**

HENRY
GREENWOOD
and Co.,
PUBLISHERS,
24, Wellington Street, Strand,
LONDON.

74043
ORC

Country Press
Percy Lund
Humphries
& Co. Ltd.

WELLINGTON
PAPERS
[illegible]
PLATINO-MATT
[illegible]
PAPER
[illegible]